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S. 1581, TECHNOLOGY TRANSFER IMPROVEMENTS ACT OF 1991

HEARING

BEFORE THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

ONE HUNDRED SECOND CONGRESS

FIRST SESSION

SEPTEMBER 13, 1991

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S. 1581, THE TECHNOLOGY TRANSFER IMPROVEMENTS ACT OF 1991

FRIDAY, SEPTEMBER 13, 1991

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The committee met, pursuant to notice, at 10:06 a.m., in room SR–253, Russell Senate Office Building, Hon. John D. Rockefeller, presiding.

Staff members assigned to this hearing: Patrick H. Windham and Loretta L. Dunn, professional staff members; and Louis C. Whitsett, minority counsel.

OPENING STATEMENT OF SENATOR ROCKEFELLER

Senator ROCKEFELLER. Good morning, everyone. I am going to forgo my statement for the moment, and maybe for the morning too because Connie Morella is with us. She and I are doing this bill in a joint way, she in the House and me in the Senate. It is the way it ought to work, Republican and Democrat working together.

She has an extremely busy schedule, and I would like for her to give her testimony, to begin this hearing.

STATEMENT OF HON. CONSTANCE A. MORELLA, U.S. REPRESENTATIVE FROM MARYLAND

Ms. MORELLA. Thank you, Mr. Chairman. I have not had an introduction that was as good as that, and I just hope there are two Senators from Maryland who did not overhear you.

I am really very proud and pleased to be here, testifying on the bill that you have introduced, which is identical to the bill that I have introduced. As you have stated, it indicates the approval of both Houses, in a very bipartisan way, to help our competitiveness.

I want to thank you very much for your strong Senate leadership in advancing the collaboration between Federal laboratories and U.S. industry in the development of computer software.

I am looking forward to continuing to work with you, and the other distinguished members of this committee, to promote our Nation's economic growth and our international competitiveness.

Throughout the 102d Congress, we, in the House, Science, Space and Technology Committee's Subcommittee on Technology and Competitiveness, have been focusing on the ability of the United States to compete internationally. As a result, we have been striving to strengthen the links between our Nation's technology base and our industry.

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One such method is to enhance technology transfer from our Federal laboratories. Federal laboratories, as we all know, are one of our Nation's greatest assets and yet, they are largely an untapped resource of technical expertise.

There are over 700 Federal laboratories throughout the Nation, occupying one-fifth of the country's lab and equipment capabilities, and employing one out of every six scientists in the United States.

In my congressional district in Maryland, I am honored to have some of the world-renowned Federal laboratories: the National Institutes of Health; the National Institute of Standards and Technology; and the Food and Drug Administration.

Senator ROCKEFELLER. That is until Senator Robert C. Byrd gets his hands on them. [Laughter.]

Ms. MORELLA. We did not hear that, and that is off the record. We do believe that Government should be on the move in terms of international competitiveness, but not on the move in that way.

I am certainly aware of the high quality of work and the vital role which Federal laboratories play in our Nation's research and development. And toward that goal of improving our international competitiveness, I introduced, in the House, H.R. 191, the Technology Transfer Improvements Act of 1991 at the beginning of this Congress. S. 1581, which is before this committee is identical to H.R. 191. It is also identical to H.R. 5850, which I introduced in the 101st Congress.

S. 1581 would, under certain cooperative research and development agreements—CRADA's—increase the transfer of technology for works prepared between Government-owned and Government-operated laboratories, with private sector industry.

It would amend the Stevenson-Wydler Technology Innovation Act of 1980 by providing Government agencies with the authority to secure copyrights for computer software prepared in whole, or in part, by Federal employees in the course of their work under a CRADA.

It would also reward the hard work of Federal scientists by providing limited royalties for the authors of computer software created under such a CRADA agreement. My bill seeks to replicate provisions of the Federal Technology Transfer Act of 1986, which apply Federal patents created under a CRADA.

Since the passage of that act, the licensing of Federal patents has become an important avenue for the transfer of Government inventions to private industry for commercial use.

Unfortunately, no companion transfer mechanism currently exists for copyrightable software. Therein lies the need for this legislation. At this point, because of that, Federal employees are not able to obtain copyright protections for their works created in the course of their official duties.

Consequently, in Federal laboratories, the incentives of proprietary rights and royalty sharing cannot be used to spur the development and commercialization of computer software. Thus, there needs to be an appropriate policy dealing with the commercialization of federally developed computer software. Otherwise, the prospects for its development and commercialization are obviously limited.

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Today's software is complex. It contains thousands of code lines and is practically useless to businesses unless they are willing to do some substantial investments of time and money. For software to be commercially valuable it has to be debugged, simplified, and training materials must be written and supplied.

Without a proprietary interest, a firm could not be assured of recouping the necessary investment in such services. Merely making software available without proprietary protection is insufficient to ensure its effective commercialization. Software protection is critical to promoting CRADA's and making Government/industry collaboration more attractive to industry.

S. 1581 would address these concerns, with the Government unencumbered by the fear that their work may fall into the public domain, private firms will more freely enter into CRADA's with the Government.

And additionally, with the incentive of royalties to develop commercially viable software under such agreements, the morale and the creativity of Federal employees would certainly be enhanced.

In the House, we have held two hearings within the Subcommittee on Technology and Competitiveness this year, which have focused upon the legislation before the committee. We have heard from a series of Federal agency officials voicing the administration's support for the bill.

We have also heard from a broad spectrum of witnesses, from members of academia, industry associations, and the Copyright Office, all in support of it. In addition, the President incorporated the provisions of the bill as one of the components of his national energy strategy.

In May we heard from Deborah Wince-Smith from the Department of Commerce, she is the next person scheduled to testify this morning and she serves as an excellent spokesperson for the administration's technology policy, along with witnesses from the Office of Naval Technology; the National Institutes of Health; the Department of Energy; and the Department of Agriculture. They all testified that the Government's lack of ability to copyright software poses significant difficulties to what would otherwise be a very attractive product transfer.

They indicated that a Federal copyright would serve as an incentive to the development of software and would be an important link in technology transfer.

Then in July, we heard from Dr. Robert White, the Under Secretary for Technology at the Commerce Department. He noted that Government-owned but contractor-operated laboratories such as Oak Ridge, Brookhaven, Lawrence Livermore, are not affected by the same prohibition against copyright protection as Government-owned and Government-operated labs.

Given the successful record to date of those contractor-operated laboratories in transferring software technology, the potential for collaborative R&D software arrangements represent an enormous opportunity for agencies such as NIST, NIH, EPA, and others.

Dr. White also testified that the goal of fostering a new era in public/private cooperation would be seriously undermined if an area of enormous economic importance and Federal expertise, such

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as computer software, continues to be regarded as lying outside the scope of Federal technology management activities.

At that time another witness, James Chandler, professor of law at George Washington University alarmed the subcommittee by stating that because the United States is prohibited from protecting Government software, billions of dollars have been lost to our international competitors. He noted, as an example, that 48 percent of the requests to the U.S. public software libraries are coming from Japanese companies—a very dramatic statement.

Indeed, our hearings in the House clearly demonstrate a strong belief that legislation such as S. 1581 is absolutely necessary. I do understand however that there is some concern that this legislation may lead eventually to the future impeding of public access to currently available software.

I believe we can ultimately balance such concerns with the vital ability to transfer the technology from one of our most valuable Government resources, our Federal laboratories, to the private sector.

For example, the bill has been carefully constructed to apply to the operational aspects of the software rather than the informational content of data bases in which the software operates. The bill applies only to software developed pursuant to a CRADA. Federal computer software, which is freely available, will continue to remain freely available to the public under the bill.

Also, the Government has "march-in" rights to assure any software developed under a CRADA is always available for governmental uses. The bill allows for free and fair public access and use.

Mr. Chairman, I strongly believe that the continued cooperation of the private sector, coupled with greater incentives in our Federal laboratories, will ultimately work to the benefit of all Americans and our Nation's economy. While this is an important bill, it is truly just a limited response to a specific problem.

I urge the members of this committee, under your great leadership, to enact this legislation quickly, so that we can continue to address the other major issues which will boost our international competitiveness.

I want to thank you very much for sponsoring this bill on the Senate side, and for your excellent statement in the Congressional Record, Mr. Chairman. I look forward to continuing to work with you, and with other members of this committee, to foster competitiveness and bolster our economy in a good bipartisan sense. This is what is best for our country.

Thank you for allowing me to expound so long on this bill. It is preaching to the choir by and large, but I think we have shown through this simple and very important bill that any reservations others may have, should be ameliorated by the virtues of this legislation.

Thank you.

Senator ROCKEFELLER. Thank you very much, "Senator" Morella. Your sponsorship of this in the House is very important. I think this has administration support, as you have indicated. I think this is going to become law, and when you consider that one-sixth of all of our scientists and engineers in this country work for Federal laboratories, it is something we had better be about very quickly.

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Senator Hollings.

OPENING STATEMENT OF SENATOR HOLLINGS

The CHAIRMAN. I am pleased that the Commerce Committee is holding this morning's hearing on S. 1851, the Technology Transfer Improvements Act of 1991. I was an original cosponsor of the 1986 Federal Technology Transfer Act, and I continue to believe strongly that the Federal Government should do everything reasonable to make its huge $70 billion annual investment in research and development more useful to American industry.

The United States is in a global economic battle to see which nations will lead in the key industries and technologies of the 21st century. Computer software, which is the focus of S. 1851, is one of those key industries, and clearly we should consider steps to make our Federal laboratories and other Federal research programs more useful to U.S. software companies. We cannot take for granted our current lead in the global software market.

I look forward to reviewing the testimony presented by today's witnesses. This hearing will help the committee in its continuing efforts to promote the economic competitiveness of the United States.

Thank you, Mr. Chairman.

Senator ROCKEFELLER. Thank you, Mr. Chairman. Senator Pressler, Senator Gorton.

Senator PRESSLER. Nothing beyond thanking Mrs. Morella for a fine statement, and also to comment on what you just said. I had not realized that one-sixth of all of our scientists work in Government laboratories.

Senator ROCKEFELLER. It is either wonderful or depressing, depending on how you may want to approach it.

Senator PRESSLER. The figure indicates, we may need to do some work on that.

Ms. MORELLA. Thank you very much.

Senator ROCKEFELLER. Let me confess something, which is that I have a complication this morning which I did not anticipate. An emergency has come up, which is going to force me to speed up this hearing in a way which I do not like to do. That is, unless I can convince either Senator Gorton or Senator Pressler to chair at 11:15 for about a half hour or so——

Senator GORTON. I will only be here for another 5 minutes.

Senator PRESSLER. I am afraid I cannot do it.

Senator ROCKEFELLER. Then I need to ask for, if not your sympathy, your understanding because ordinarily, what you want from a hearing like this is to dig into witnesses' testimony and to bring out precisely the kind of information that our people insufficiently aware of.

That is really why hearings are important, because you get a chance to bring things out which otherwise would not come out. That is intellectually extremely important and, therefore, legislatively important.

This will then have to be a different kind of hearing. I do not like to do business this way, but I have to, so I apologize to the witnesses because although your day will be shorter, we will not question you the way that I would like to.

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I will followup and you may have questions from me and I would hope that we could have your answers within 10 days in the committee. And again, I seek your understanding. I am embarrassed and apologetic but I have to operate that way unfortunately today.

The Honorable Deborah Wince-Smith is the Assistant Secretary for Technology Policy and a very good one in the Department of Commerce, whom I enormously enjoy working with. It is, I guess, my favorite Government agency. Few people say that, so I thought I would drop that in. [Laughter.]

John Ols is Director of Resources, Community and Economic Development for the General Accounting Office; and Ralph Oman is the Register of Copyrights, which is an extraordinarily important function. If you had to quiz Americans on what it is that you do, Ralph, the response would be short, and that is too bad, because what you do is incredibly important.

I welcome each of you here and, Deborah, perhaps we could begin with you.

STATEMENT OF DEBORAH L. WINCE-SMITH, ASSISTANT SECRETARY OF COMMERCE FOR TECHNOLOGY POLICY ON COMMERCIALIZING FEDERALLY DEVELOPED SOFTWARE, DEPARTMENT OF COMMERCE

Ms. WINCE-SMITH. Thank you, Mr. Chairman, members of the committee, I am very pleased to be here today to testify——

Senator ROCKEFELLER. Deborah, excuse me, I did not even ask whether Senator Gorton or Senator Pressler have anything they want to say.

Senator PRESSLER. I have a short opening statement I will put in the record.

[The prepared statements of Senator Pressler and Senator Kasten follow:]

PREPARED STATEMENT OF SENATOR PRESSLER

Mr. Chairman, thank you for holding these hearings on this issue. It is important that we take a close look at how current copyright law is impacting American competitiveness.

Some companies feel that the inability to copyright software developed while engaged in cooperation with the Federal Government discourages real innovation. This is a real concern. If a company has no real assurance that it can recapture its investment in research and development then it will not enter into a partnership in the first place.

A fundamental question this bill raises, however, is whether a private company should profit from software developed with taxpayers' money. I look forward to hearing from today's witnesses on this and a number of other questions.

PREPARED STATEMENT OF SENATOR KASTEN

Mr. Chairman, I am pleased that you are chairing this hearing today on S. 1581, the Technology Transfer Improvements Act.

I commend you on introducing this bill to address the problem resulting from the disparate treatment between patents and copyrights of computer software in which the Federal Government has participated with private companies.

This is one of those areas in which we can legislatively provide a framework that will improve America's ability to compete, and thus continue to assure jobs for our workers and our standard of living. We want to encourage public and private sector cooperation in the development of new products and services, and then in getting to market with them. The improvements enacted in the patent area several years ago would be reflected in the changes in the copyright laws.

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This is supported by the administration and encourages the closer Government/business cooperation we all speak about. S. 1581 is a good bill, I congratulate the chairman for introducing it, and look forward to this hearing.

Ms. WINCE-SMITH. Mr. Chairman, I am very pleased to be here to testify on behalf of the administration in support of S. 1581, the Technology Transfer Improvements Act of 1991.

I have a statement which I have entered into the record, and I would like to summarize my statement at this time.

As we know, the immediate purpose of this legislation is to promote the commercialization of computer software developed by Federal employees in our Federal laboratories. Its broader, long-term purpose is to reinforce the administration's goal that began in earnest with the enactment of the Federal Technology Transfer Act in 1986 of forging closer collaboration between Federal laboratories and the private sector, so as to convert our world-class research strength into commercial success.

And I would like to acknowledge, of course, today that you, Senator Rockefeller, and you, Senator Gorton, took a very strong leadership role in the enactment of the 1986 Technology Transfer Act, which is certainly reaping tremendous success right now in the U.S. industrial arena.

This legislation is based on a proposal that was developed by our Technology Administration in Commerce, with the support and help of the Patent and Trademark Office. It has very strong support within the Bush administration, and as we have heard this morning, it has the strong support of important members of the House committee, Mrs. Morella and Mr. Thornton.

It has the support of our scientists and technical personnel throughout the Federal laboratory system, of distinguished intellectual property law specialists, and of U.S. firms who recognize its significance to our global competitiveness.

As we have already heard this morning, the importance of software to our national economy cannot be overstated. The industry is unquestionably the world leader. Sales last year reached $29 billion, which in itself represented a 20-percent increase over 1989 levels. Sales should rise to about $35 billion this year, and by mid-decade could reach $100 billion.

However, we should not think of computer software just as a commodity to be sold. Computer software is a research product that cuts across virtually every scientific discipline and technical activity.

As such, it is a vital, fundamental part of every aspect of modern life, from managing and using data, accelerating the design, development, and rapid introduction of a vast array of new, defect-free products.

The strength of our computer software industry is crucial to the computer industry, and as we witnessed most recently in Desert Storm, it is vital to our defense. It gave us a very strategic advantage in the operations in the Middle East.

It permeates industrial sectors as diverse as telecommunications, electronics, aerospace, transportation, and all financial services. It has now become a very essential component of advanced manufacturing, and it is a fundamental building block of the manufacturing production systems of the next century.

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Our current leadership position we cannot take for granted. As in other enabling technologies, the software competition internationally is here and it is very fierce. Japanese software suppliers are growing increasingly sophisticated and they have now pioneered a new discipline in Japan known as software engineering.

We recognize that the lack of suitable software application often is a barrier to market success of a new computer, or it can limit the effective use of a computer, and we know this is an industry that our foreign competitors particularly in the Far East want to dominate.

Senator ROCKEFELLER. Deborah, can I interrupt and simply ask you to tell us something about the Japanese new Sixth Generation computer project?

Ms. WINCE-SMITH. Yes, I would be happy to.

Senator ROCKEFELLER. Could you say something about that?

Ms. WINCE-SMITH. Indeed, I was going to mention it. The Sixth Generation computer project is one that MITI has put together. It is a research effort being led in Japan, but it will involve potential collaboration. This is the sixth generation of computer development and it deals with light-driven computers. Again, software systems integration capability will be at the heart of its success.

And the Japanese, through MITI, have approached the United States about potentially participating in this, and the way right now that the program is crafted, it really does identify U.S. research strengths in this area.

Software and systems integration are still major weaknesses for the Japanese and it is also key components of the intelligent manufacturing systems proposal that they have put on the table. Commerce is taking the lead in forging a U.S. national response with industry to that proposal.

I do know if you all read in the paper about the recent joint venture between Howe Computer and Fujitshu, but for $40 million, Fujitshu will obtain access to software and systems integration capability from Howe. Fujitshu's arrangement with McDonnell Douglas also has software and systems integration. It goes on and on and on.

So, this is, without question, one of the areas highlighted in all the enabling technology reports that have been issued, where we are the world leader. But it is very, very heavily targeted by our competitors.

And also by the Europeans. We just successfully concluded negotiations so that the European Community would not issue a directive that would allow for the reverse engineering of computer software.

Senator PRESSLER. Why are the Japanese weak in the software area?

Ms. WINCE-SMITH. Well, some people think it is because up to this time, software has really been a creative activity. It is one where individualistic, entrepreneurial type of individuals have been at the forefront. But when I alluded to the software engineering discipline that they are now pioneering, they are setting up software factories.

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And we just heard that MITI is going to be giving a major loan program for this type of activity. I am one of the people who believes that over time, they will not be weak in software.

Senator PRESSLER. I think you are right. Please go ahead.

Ms. WINCE-SMITH. Well, the other point I could just quickly make here is that we know that it is our software capability that is really giving us a competitive edge in the supercomputer area. In many of the hardware areas we are neck-and-neck with our competitors, but it is the software that makes the critical difference in that sector as well.

As we have heard this morning, there is a formidable storehouse of talent and expertise in our Federal scientific establishment and software activities are again permeating all of these research facilities. Our Federal researchers are at the cutting edge.

They are working in this area, consistent with their mission requirements, and we are doing everything we can to try to forge partnerships with U.S. industry.

The Technology Administration, in cooperation with DOD, is also working with U.S. industry to try to develop product data exchange standards or PDES, which will provide through software, a key way for manufacturers to express all useful information about a product's dimensions, materials and performance characteristics in digital form. This information will be accessible to manufacturers, suppliers, contractors and other support groups.

Now this is very much more significant than just a standards issue, because what we think we will accomplish when we have PDES in place, is that we will begin to see the practice of concurrent engineering in U.S. industry, where we integrate product design, manufacturing, and marketing. And this should really speed up our ability to be first to the market, which, as we know, is one of our weaknesses right now. Foreign competitors are on the average introducing products twice as fast as U.S. firms.

And one of the key reasons for that is that we are still doing obsolete linear innovation where we do not integrate. Again, computer software is at the heart of that standardization effort.

The major R&D programs that are going to be launched and are being launched, the human genome project, the superconducting supercollider, the new high-speed computing and communications initiative and the space station, all again have major software development and application potentials and our Federal scientific establishment is at the heart of those efforts.

As we heard this morning from Congresswoman Morella, we now lack a legal system to encourage Federal and private sector software researchers to cooperate in a way that will promote the rapid commercialization of these world-class assets we possess.

Under our current law, the Government cannot secure copyright in software produced by Federal employees in the course of their official duties. Not one of USDA's cooperative R&D agreement under the Technology Transfer Act relates to software commercialization, even though 5 to 10 percent of their research is in the software arena.

We have heard this morning why this commercialization is not occurring. We have numerous examples, and I have them in my written testimony. Our Federal labs have made overtures in a very

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fair, open way to a wide range of U.S. firms to see if they would come in and enter into a CRADA to take an innovation forward into the commercial arena, and the firms have said they do not want to participate because of the lack of protection for computer software which will be at the heart of any project.

The Federal Technology Transfer Act of 1986 provides the incentives for this commercialization, because it does provide proprietary protection for inventions that come out of the Federal labs allows the Federal laboratory to provide exclusive licenses and participate in royalty-sharing. I will not go into all of that because it is in my statement, and we are all familiar with it.

We now have a record in which U.S. companies are eagerly participating in these new authorities. We have over 500 cooperative research and development agreements. Commerce hosted last week a big conference on environmental technology where for 2 days we presented before U.S. industry research that is coming out of our Federal labs in the environmental technology area, and then we showed industry some of the opportunities available for export into Eastern Europe.

We think as a result of that effort, we are going to see more work in the environmental technology area. Again, software was a theme. I had a question at that conference on this bill and there was a tremendous discussion on the panel on technology transfer: why we do not have this legislation in place? So, I wanted to share that with you this morning.

The bill under consideration today really is a key extension of the policies and the principles that the administration and the Congress have been pursuing together in a bipartisan way since the early 1980's. It extends the legal protection for inventions to computer software developed at our Government-owned, Government-operated laboratories.

And as we heard from Congresswoman Morella, this protection is available at our Government-owned, contractor-operated laboratories and we do not see any reason why it should not be extended to Government-operated labs as well.

In short, Mr. Chairman, I would like to conclude by saying, we strongly support this legislation. We strongly applaud your leadership in putting forward this critical bill and we look forward to its early passage.

We think it will make another important contribution to keeping world-class American leadership, as we begin to face a new economic arena that is shaping before our eyes right now. Thank you very much.

[The prepared statement of Ms. Wince-Smith follows:]

PREPARED STATEMENT OF DEBORAH L. WINCE-SMITH

I am very pleased to be here today to testify on behalf of the Administration in support of S. 1581, the "Technology Transfer Improvements Act of 1991."

S. 1581's immediate purpose is to promote the commercialization of computer software developed by federal employees in our federal laboratories. Its broader, long-term purpose is to reinforce the Administration's goal, that began in earnest with the enactment of the Federal Technology Transfer Act of 1986, of forging closer collaboration between federal laboratories and the private sector so as to convert our research strength into commercial success.

This important legislation is based on an Administration proposal submitted by Secretary Mosbacher. It is supported by important members of the House Science

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Committee, including Ms. Morella and Mr. Thornton, by scientists and technical personnel throughout the federal laboratory system, and by distinguished intellectual property law specialists. It is supported by many U.S. firms that understand its importance and its potential to achieving the goal of translating our world-class scientific and engineering accomplishments into economic successes in global markets.

As Senator Rockefeller so eloquently stated in his remarks upon introducing the bill: "* * * using the fruits of Federal-private cooperative research to better competitive advantage is so basic and so important that it deserves our rapid consideration."

Forging strong linkages between our unparalleled federal R&D establishment and the private sector is especially important with respect to computer software, given its overall importance to our national economy, the tremendous changes within the software and computer worlds, international challenges, the possibility of shortages in programmers and computer specialists, and the enormous software expertise that exists within our federal laboratories.

The importance of software to our national economy cannot be overstated. The U.S. software industry is unquestionably the world leader. Sales last year reached $29 billion, which itself represented a 20 percent increase over 1989 levels. Sales should rise to about $35 billion this year and, by mid-decade, could reach $100 billion.

However, we should not think of computer software just as a commodity to be sold with a beneficial impact on our balance of trade. It is a research product that cuts across virtually every scientific discipline and technical activity. As such, it has become a vital and fundamental part of virtually every aspect of modern life from managing and using data to speeding up the design, development and rapid introduction of a vast array of new, defect-free products.

Indeed, the strength of the software industry is crucial to the computer industry, is vital to defense and civilian agency operations, and to industrial sectors as diverse as telecommunications, biotechnology, electronics, aerospace, transportation, and finance. It is an essential component of advanced manufacturing systems, which are so essential to our long-term competitiveness.

Given its importance, it would be a mistake to overlook or minimize the significant challenges facing the software industry if U.S. leadership in software is to be preserved or to overlook the importance of ensuring that our nation's young people have some measure of computer literacy if they are to thrive in tomorrow's world of increasingly sophisticated home and work environments.

The signs of the challenge to U.S. leadership are everywhere.

International competition is heating up. Foreign software suppliers will grow increasingly sophisticated. They recognize that lack of suitable application software can be a barrier to the market success of a new computer or can limit the effective use of a computer. Thus, foreign commercial interests have long appreciated U.S. software skills. Foreign investors have acquired equity positions in numerous U.S. computer equipment and software firms since 1980.

We hear of new alliances between firms that had until recently been fierce rivals, such as Apple and IBM, or of efforts to create new software techniques, such as object-oriented programming.

And the convergence of computers and telecommunications and the rapid application of software to the manufacturing arena is contributing to the clamor for software standardization and simplified data exchange. As economic integration becomes a reality in Europe, such issues as copyright protection for software interfaces becomes increasingly important.

Indeed, these are exciting, challenging times. Federal scientists, engineers and other technical personnel at federal laboratories, consistent with their mission requirements, can and should be encouraged, where appropriate, to work with industry.

Clearly there is a formidable storehouse of talent and expertise in our federal scientific establishment. Software activities at federal agencies such as NIST, NASA, DOD, NIH, and DOE—whether at laboratories operated by the federal government, such as NIST, or by contractors, such as the Jet Propulsion Laboratory or DOE's national labs—are at the cutting edge of computer and software technology.

My own agency, the Technology Administration, with the cooperation of DOD, is working to develop Product Data Exchange Standards, or PDES, which will provide a way for manufacturers to express all useful information about a product's dimensions, materials, and performance characteristics in digital form that would be accessible to a manufacturer's suppliers, contractors and other support groups. Through this, we hope to better integrate product design, manufacture and marketing.

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And federal employees throughout government are involved in other exciting software developments, ranging from the production of software useful in vocational training, in predicting the spread of fires, in diagnosing and treating disease, and in helping farmers make decisions about crops. And, of course, major programs—such as the Human Genome Project, the Superconducting Supercollider, and the High Speed Computing and Communications Initiative, and the Space Station—present additional opportunities for the federal scientific establishment to make world-class contributions to generic and application-specific software development.

Yet despite computer software's relevance to our national economic competitiveness, despite the global challenges that face the industry, and despite the talent that exists within the federal R&D establishment, we simply do not have a law in place that permits the rapid commercialization of valuable software produced at federal laboratories.

Under current law, the Government cannot secure copyright in software produced by federal employees in the course of their official duties. As a result, opportunities for closer collaboration between federal and private sector researchers and opportunities to reap economic advantage from federal technology remain irretrievably lost.

For example, not one of USDA's cooperative R&D agreements relates to software commercialization even though five to ten percent of its research is software-related. Federal technology transfer officials report lost opportunities for encouraging private sector development of potentially valuable federally developed software, such as that related to medicine, education, or agriculture.

There are several reasons why this research fails to be commercialized. First, much of the software produced in federal agencies is produced for specific federal needs or is designed as a prototype to prove that a concept works. This means that much additional work has to be done before the software can be marketed for commercial purposes. It has to be adapted to the needs of commercial users, debugged, simplified, or customized; and training materials have to be developed and packaged.

Given their fundamental mission responsibilities and research focus, federal employees, where appropriate should have the incentive to look beyond the immediate purposes for which they have produced the software to make it available for commercialization by the private sector. In turn, our private sector has little incentive to undertake such development without receiving adequate insurance that it will be able to recoup the investment. Appropriate incentives, including intellectual property rights, are required. In the case of computer software, these incentives do not exist.

By contrast, as a result of the Federal Technology Transfer Act of 1986, we do have in place a rational, workable system that allows federal agencies to assert ownership rights to inventions made by their employees through patents, to convey rights to such inventions to third parties, and to share, along with the employee-inventor, in the resulting royalties.

As a result, U.S. companies and federal laboratories are confidently and eagerly entering into cooperative research and development arrangements (CRADAs) of mutual benefit and agreeing in advance on the rights to any inventions made by federal employees under the arrangement. In short, federal agencies and their employees have incentives to consider the commercial ramifications of their work up front and, where appropriate, to enter into collaborative partnerships with U.S. firms. Firms have assurance that they will be the principal beneficiaries of the technology that they have financed—not their competitors, which might be the case if the research product simply entered the public domain.

This partnership between our federal labs and private firms is working well. More than five hundred CRADAs are now in place. The number of inventions disclosed by federal laboratories jumped 48 percent over the last three years and at some, such as HHS, the number of patent applications has doubled.

Secretary Mosbacher's prediction in his 1989 report to Congress on the operation of the Federal Technology Transfer Act—that "in future years we will look back on it as one of the seminal developments in the history of federal efforts to put technology to work for the taxpayers who paid for it"—is well on the way to being fulfilled. We are still tabulating the returns for our second report to Congress, but preliminary indications—based on such factors as number of CRADAs, number of inventions reported, patent applications, and royalties—show that his prediction was on the mark.

Accordingly, S. 1581, the bill under consideration today, is a key extension of the principles and policies of the Federal Technology Transfer Act. It extends the legal protections and incentives available for inventions to computer software developed at government-owned, government-operated laboratories. As such, it eliminates a number of artificial distinctions.

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First, it eliminates the anomaly that says it is Permissible for a federal laboratory to obtain and convey patent rights on a computer process implemented by software but not to secure a copyright on the program that implements that process. Most academic and intellectual property experts believe that patents and copyrights are not simple alternatives where computer software is concerned. They protect very different things. In addition, there are complex statutory requirements that have to be satisfied to obtain a patent and the process can be costly and time-consuming—a situation that is often unworkable if the product has a short economic lifetime, as is so often true in the case of computer software.

Copyright, on the other hand, which protects the expression of an idea, is easy, inexpensive, and normally outlives the market life of the software—all the attributes that are necessary if those who create it and take the risks of marketing it are to receive appropriate economic compensation.

Second, S. 1581 eliminates the anomaly that says it is okay to secure copyright for software produced by your employees if you are a government-owned, contractor-operated laboratory, or GOCO, but not if you are a government-owned, government-operated laboratory, or GOGO.

For ten years—starting with the Bayh-Dole Act of 1980 and most recently with the National Defense Authorization Act for Fiscal Years 1990 and 1991—federal policy has sought to increase private sector opportunities for the commercialization of technology developed under federal sponsorship, whether by federal contractors or the government's own employees. Arbitrary distinctions between these GOCOs and GOGOs are counterproductive and should not be maintained.

This is certainly true with respect to the development of computer software which has long been a major R&D activity at Oak Ridge, Lawrence Livermore, Brookhaven, Sandia, Argonne and other contractor-operated laboratories. There is no reason to treat the management of computer software differently at NIST, NIH, NASA, EPA and other government-operated facilities.

In conclusion, the Administration strongly supports this legislation which will permit more rapid commercialization by the private sector of American technology assets in an area where we have world leadership. Passage of this legislation is fundamental to achieving our long-term goal of breaking down the walls that have for so long hindered effective collaboration between public and private researchers. The legislation achieves its objectives carefully and precisely, as it applies specifically to the operational aspects of the software, rather than to its informational content, and to those CRADAs entered into pursuant to the Federal Technology Transfer Act or similar authority, such as the National Aeronautics and Space Act of 1958.

The Federal Technology Transfer Act of 1986 was a major step forward in enlisting the enormous talent that resides in our federal research environment in the effort to create market opportunities at home and abroad and to maintain U.S. technological leadership in an increasingly competitive world environment. S. 1581 will contribute substantially to its ability to get the job done.

Thank you, Mr. Chairman. That completes my statement and I will be happy to answer any questions you may have.

Senator ROCKEFELLER. Thank you very much. I am particularly happy that we are working together with the administration, and that the administration is taking a leadership position on this, because it does involve both Government and industry.

Sometimes people are nervous when that happens, but the way you have identified the problem and spoken about what industry is in fact saying to you, and the fears that they do have and therefore the need for this legislation, I think you are right on target and I am very happy with what you have said.

Senator PRESSLER. I have some questions for the record.

Senator ROCKEFELLER. John, we look forward to hearing from you.

STATEMENT OF JOHN M. OLS, JR., DIRECTOR, RESOURCES COMMUNITY, AND ECONOMIC DEVELOPMENT DIVISION, GENERAL ACCOUNTING OFFICE

Mr. OLS. Thank you. I am pleased to be here today to share with you, one, some of the views that we gathered in a study we issued in June 1990 on the constraints to the transfer of Federal computer

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software and, two, the implications of your proposed bill, S. 1581, to solve that particular problem.

The 1990 report was really a followon from a report we issued in 1988 that identified the lack of ability to transfer computer software as an impediment to Federal technology transfer, as many people have talked about already this morning.

What I would like to do is just summarize some of the highlights of our prior report that I think come to bear very closely on the legislation and our support for S. 1851 as a positive step forward in the Federal technology transfer area.

In response to the rising concern about the U.S. trade deficit and the ability of U.S. businesses to compete in world markets, the Congress and the administration have taken various actions to strengthen the links between U.S. industry and the Nation's research and technology base. These actions include stimulating the transfer of technology from Federal labs, which funded about $16 billion in R&D in fiscal year 1990 to U.S. businesses.

To support this goal, legislation over the past 11 years has authorized Federal agencies to grant nonexclusive, partially exclusive, or exclusive patent licenses, negotiate rights to intellectual property under a cooperative R&D agreement, and give Federal inventors a share of any royalties from a licensed invention.

Although this legislation has facilitated the commercialization of Federal inventions, it has not addressed Federal computer software, computer programs, and supporting documentation, which currently cannot be copyrighted, as we have heard from the witnesses already. Under current Federal law, Federal agencies cannot copyright and license their computer software.

Our report in part examined the extent to which copyright law has constrained the transfer of Federal software and the pros and cons of amending copyright law to allow Federal agencies to copyright computer software. More specifically, we obtained information from researchers, laboratory managers, senior officials at six Federal agencies on the extent to which copyright law had constrained the transfer of Federal software. These six agencies accounted for about 89 percent of the R&D work performed in Government laboratories in fiscal year 1989.

Overall, officials at the six agencies stated that a significant portion of their laboratories' software has not been effectively transferred to and used by U.S. businesses because of the copyright prohibition. Officials at four of these agencies estimated that at least 10 percent of their laboratories' software had potential commercial applications that could have important technological and economic benefits to the nation.

The agency officials we interviewed believed that the Government's limited success in developing and commercializing software through cooperative R&D agreements is the result of the copyright law's prohibition.

Effective transfer of this software is an appropriate goal that could be achieved by amending the law to provide agencies the authority to copyright and license computer software with commercial applications. Such a fundamental change, however, should be balanced against the concern that by licensing such software to indi-

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vidual companies the public's access to the software and related Federal data bases might be excluded.

In addition, such a change might shift the Federal laboratories' mission from basic to more applied research by giving U.S. businesses an incentive to work with Federal laboratories.

We suggested two options for accommodating these concerns while still achieving effective technology transfer. One would be to amend the copyright law to allow Federal agencies to copyright and grant licenses to computer software on a case-by-case basis, if such protection would stimulate the software's effective transfer and use.

The second option was to modify the Stevenson-Wydler Technology Innovation Act of 1980, which could be amended to allow Federal agencies to copyright and grant licenses to Federal software developed under a cooperative R&D agreement. This second option, which was included in our prior report, is the approach taken by your proposed legislation, Mr. Chairman, and we totally agree with this approach to address this issue, or at least it is a first step to address this issue.

Its coverage is limited to computer software developed with another organization under a cooperative R&D agreement, and I should emphasize this would not include software developed at a Federal laboratory prior to such an agreement or computer data bases, which has been a concern raised by many.

Although limited in coverage, this approach should stimulate agreements between Federal laboratories and U.S. businesses for developing computer software and consequently should strengthen Federal technology transfer programs.

Your proposed legislation would also amend the Stevenson-Wydler Technology Innovation Act by providing researchers who develop software under a cooperative R&D agreement, that they share in royalties, which would make them on a par with inventors who now have that opportunity to share royalties for inventions that are patented and licensed. I think this would help to provide consistency in the Federal policy for rewarding Federal scientists. It also would provide an opportunity to make, as the Assistant Secretary of Commerce has spoken about, Government laboratories similar to contractor laboratories, where they have the rights already to copyright.

So, both of those provisions would bring the entire Federal technology policy into a little bit more consistent operation.

Mr. Chairman, that concludes my remarks and I will be glad to answer any questions.

[The prepared statement of Mr. Ols follows:]

PREPARED STATEMENT OF JOHN M. OLS, JR.

I am pleased to be here today to present our views on the current copyright law's constraints on the transfer of certain federal computer software and the implications of the proposed Technology Transfer Improvements Act of 1991 (S. 1581) to address them. My statement is based on a report we issued on June 1, 1990 (Technology Transfer: Copyright Law Constrains Commercialization of Some Federal Software (GAO/RCED-90-145)). This report was prepared for the Subcommittee on Courts, Intellectual Property and the Administration of Justice, House Committee on the Judiciary.

Under current federal law (17 U.S.C. 105), federal agencies cannot copyright and license their computer software. Our report examined (1) the extent to which copy-

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right law has constrained the transfer of federal software and (2) the pros and cons of amending copyright law to allow federal agencies to copyright computer software. More specifically, we obtained information from researchers, laboratory managers, and senior officials at six federal agencies on the extent to which the copyright law had constrained the transfer of federal software.[1] These agencies funded about 89 percent of the research and development (R&D) performed at all government-operated laboratories in fiscal year 1989.

I would like to summarize the results of this work. Overall, officials at the six agencies stated that a significant portion of their laboratories' software has not been effectively transferred to and used by U.S. businesses because of the copyright prohibition. Officials at four of these agencies estimated that at least 10 percent of their laboratories' software had potential commercial applications that could have important technological and economic benefits to the Nation.

Effective transfer of this software is an appropriate goal that could be achieved by amending the law to provide agencies the authority to copyright and license computer software with commercial applications. Such a fundamental change, however, should be balanced against the concern that by licensing such software to individual companies, the public's access to this software and related federal data bases might be excluded. In addition, such a change might shift the federal laboratories' mission from basic to more applied research by giving U.S. businesses an incentive to collaborate with federal laboratories. We suggested two options for accommodating these concerns and still achieve effective transfer. One would be to amend the copyright law to allow federal agencies to copyright and grant licenses to computer software on a case-by-case basis if such protection would stimulate the software's effective transfer and use. Alternatively, the Stevenson-Wydler Technology Innovation Act of 1980 could be amended to allow federal agencies to copyright and grant licenses to federal software developed under a cooperative R&D agreement.

This second option is the approach taken by the proposed legislation (S. 1581) and should enhance the ability of federal agencies to enter into collaborations involving software between federal laboratories and U.S. businesses and thus result in the development of software with commercial applications.

BACKGROUND

Copyrights protect literary and artistic expression by giving authors, for a limited period of time, the exclusive right, among other things, to reproduce and sell copies of their copyrighted work and prepare derivative works. But under 17 U.S.C. 105, the U.S. government is prohibited from copyrighting any of its works, including technical publications, computer software, and data bases. The law's legislative history states that this prohibition is intended to place all works of the federal government in the public domain. Most federal computer software is generated by federal agencies' laboratories as part of their research mission. This software is primarily distributed through the National Technical Information Service (NTIS) and other software distribution centers operated by the Department of Energy and the National Aeronautics and Space Administration (NASA).

In response to the rising concern about the U.S. trade deficit and the ability of U.S. businesses to compete in world markets, the Congress and the administration have taken various actions to strengthen the links between U.S. industry and the nation's research and technology base. These actions include stimulating the transfer of technology from federal government-operated laboratories, which funded an estimated $16.1 billion in R&D in fiscal year 1990, to U.S. businesses. To support this goal, legislation over the past 11 years has authorized federal agencies to (1) grant nonexclusive, partially exclusive, or exclusive patent licenses; (2) negotiate rights to intellectual property under a cooperative R&D agreement[2]; and (3) give federal inventors a share of any royalties from a licensed invention. Although this legislation has facilitated the commercialization of federal inventions, it has not addressed federal computer software—computer programs and supporting documentation- -which currently cannot be copyrighted.[3]

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[1] These agencies are the Departments of Agriculture, Commerce, and Defense; the Environmental Protection Agency; the National Aeronautics and Space Administration; and the National Institutes of Health.

[2] Intellectual property rights result from the physical manifestation of original thought.

[3] Our March 1988 report, entitled "Technology Transfer: Constraints Perceived by Federal Laboratory and Agency Officials" (GAO/RCED-88-116BR, Mar. 4, 1988), identified copyright law as one of four constraints to the transfer of federal technology to U.S. businesses.

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COPYRIGHT LAW CONSTRAINS TRANSFER OF CERTAIN FEDERAL SOFTWARE

According to federal officials we talked with, making software generally available allows for the adequate dissemination of most of their agencies' software. They noted that their agencies primarily develop research-related software for specific scientific applications related to their missions. This software typically has little commercial application.

However, senior officials from some agencies told us that their inability to copyright and exclusively license computer software has constrained the transfer and use of a certain portion of software that has broader commercial applications. These agencies are the Departments of Agriculture; Commerce; and Defense, including Air Force, Army, and Navy; the Environmental Protection Agency (EPA); NASA; and the National Institutes of Health (NIH). Software constrained by the copyright prohibition includes, for example, artificial intelligence software that could assist doctors in diagnosing diseases or farmers in making decisions about irrigating, fertilizing, or spraying their crops. While these officials did not know exactly how much of their agencies' software was affected by the copyright prohibition, officials for Agriculture, EPA, NASA, and NIH believe that a conservative estimate would be 10 percent of all of their software.

Just as businesses are unwilling to commercialize inventions without patent protection, they are generally unwilling to invest in documenting and developing commercial applications for federal software without having copyright protection. Executives from two businesses that have considered commercializing federal software noted that a business' return on investment is time-sensitive. To prevent competitors from marketing alternative software packages that are potentially less developed and less expensive, their companies would require copyright protection and exclusive rights to federal software.

The officials at the six agencies concerned about copyright law cannot precisely determine the extent to which the government's inability to copyright has constrained their laboratories' efforts to transfer software because cases often do not come to their attention in the first place. For example, when a business knows that it cannot copyright government work, it generally does not seek to license the software or enter into a cooperative R&D agreement to further develop it. In other cases, senior laboratory administrators, technology transfer officials, and patent attorneys never learn of opportunities to transfer laboratory software. This occurs because preliminary negotiations between private and government representatives, which occur at lower levels within the laboratory, fall apart early on because of the government's inability to copyright and license software.

During our work we were made aware of several specific instances in which the transfer of software has been constrained because a business could not protect it by a copyright. According to an NIH research manager, for example, the government's inability to copyright has constrained efforts to commercialize a computer program that would assist dermatologists in prescribing medications and other treatments for medical problems, such as acne. Because the software needed to be tested among larger groups of dermatologists before it could be marketed, NIH sought a business that would assume this responsibility. An executive for a small business stated that his company was interested in the software, but it clearly was an early version that would have to be further developed before it could be marketed. His company decided not to try to commercialize the software in part because of the company's inability to obtain copyright protection, which created uncertainty over whether it could sufficiently protect its investment from a competitor who might be able to obtain the same software from NIH or NTIS. NIH has not further developed the software and has yet to attract a business partner to commercialize it.

Although Agriculture, EPA, and NIH reported that they have entered into a total of 472 cooperative R&D agreements as of September 1991, only 3 of these agreements have a major software component. In contrast, the National Institute of Standards and Technology within Commerce recently told us that 59 of the 141 cooperative R&D agreements it has entered into involve computer software. Overall, the consensus of the agency officials we interviewed is that the government has had limited success in developing and commercializing software through cooperative R&D agreements as a result of the copyright law's prohibition on copyrighting.

PROS AND CONS OF AMENDING COPYRIGHT LAW FOR FEDERAL COMPUTER SOFTWARE

According to senior officials at the six agencies concerned about the copyright law, to improve the transfer and use of federal software with commercial applications, the government should be allowed to copyright and exclusively license computer software, and federal researchers should be able to share in any royalties from licensed software. With such changes, businesses could protect their investment in

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developing and marketing the software, and federal researchers would have an incentive to work with businesses in developing and documenting the software.

The authority to copyright and share royalties would provide federal computer programmers with opportunities for career, financial, and intellectual recognition similar to those for federal researchers whose inventions are patented. In addition, these authorities could improve public access to federal software because the software might not otherwise be sufficiently developed and documented for general dissemination. Several agency and laboratory officials also noted that copyright authority would further their agencies' missions to improve public health and safety because they could better control the software's quality and distribution.

Some federal laboratory managers and researchers, however, oppose amending the copyright law. In their view, copyrighting and licensing federal computer software could interfere with (1) informal exchanges between federal and university scientists and (2) the government's existing policy of publicly disseminating technical information. In addition1 Information Industry Association representatives oppose allowing federal agencies to copyright computer software because agencies might use this authority to either restrict access or give favored access to federal scientific and demographic data bases, such as those at NIH's Library of Medicine or the U.S. Census Bureau.

To accommodate these concerns and still achieve effective transfer, we suggested in our report that the Congress may wish to consider providing copyright authority for software with wider commercial applications that needs further investment to be effectively transferred. We suggested two options for achieving this. One would be to amend the copyright law (17 U.S.C. 105) to allow federal agencies to copyright and grant nonexclusive, partially exclusive, or exclusive licenses to computer software on a case-by-case basis if such protection would stimulate the software's effective transfer and use. If the copyright law were amended, consideration should be given to instituting procedures similar to those required for granting patent licenses (35 U.S.C. 209) to ensure fairness in granting an exclusive or partially exclusive license to a nonfederal entity and diligence by the licensee in commercializing the software. Alternatively, the Stevenson-Wydler Technology Innovation Act (15 U.S.C. 3710a) could be amended to authorize federal agencies to copyright and grant licenses to federal software under a cooperative R&D agreement.

Our second option is similar to the approach proposed by the Technology Transfer Improvements Act of 1991. Its coverage is limited to computer software developed in collaboration with another organization under a cooperative R&D agreement. Although limited in coverage, this approach should stimulate collaborations between federal laboratories and U.S. businesses for developing computer software and, consequently, should strengthen federal technology transfer programs.

The proposed legislation would also amend the Stevenson-Wydler Technology Innovation Act's royalty-sharing section (15 U.S.C. 3710c), as we suggested in our 1990 report, to allow federal researchers who develop software under a cooperative R&D agreement that is subsequently commercialized to share in royalties. This proposed change would provide an added incentive for federal researchers to collaborate with U.S. businesses in developing and transferring computer software, and provide consistency with federal policy for rewarding federal inventors.

Mr. Chairman, this concludes my remarks. I would be happy to respond to any questions you or other members of the committee may have.

Senator ROCKEFELLER. Isn't it amazing that when you consider Control Data and so many others who are reluctant to do business with the Federal Government because of this copyright problem, isn't it rather incredible that it is so easy to fix? It does not cost anything, does it?

Mr. OLS. I would agree with that.

Senator ROCKEFELLER. It is a question of how many times we have to get smart in this country. Getting smart when it is easy should not be too difficult.

Larry, do you have any questions?

Senator PRESSLER. No, thank you, Mr. Chairman.

Senator ROCKEFELLER. John, again I apologize for pushing forward, but I know you understand. Ralph, we would be very pleased to hear from you.

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STATEMENT OF RALPH OMAN, REGISTER OF COPYRIGHTS, COPYRIGHT OFFICE, LIBRARY OF CONGRESS

Mr. OMAN. Thank you very much, Mr. Chairman, Senator Pressler. I am the Register of Copyrights, and I appreciate the opportunity to testify. I have submitted a longer written statement that I understand will be included in the record. I will try to keep my summary short.

As you know, Mr. Chairman, S. 1581 would permit Federal agencies to copyright the operational aspects of any software jointly created by Federal employees with their private sector counterparts. The Government can already authorize a private contractor who develops a computer program using Government money to copyright that program in the company's name. The contractor can do so as long as no Government employee helps to develop the program.

S. 1581 would change that and would override the current absolute prohibition of the Copyright Act against copyrighting works by U.S. Government employees.

As Mr. Ols noted, Stevenson-Wydler allows Government agencies to patent inventions that are developed jointly with private industry under Government-funded research and development agreements. Your bill would allow Federal agencies to copyright computer programs created under similar agreements.

If the bill is enacted, the agency involved in the agreement could get copyright protection for the program and it could get royalties for the commercial exploitation of that work. It could also assign its copyright to its private sector partner or to another private sector party, if that assignment is deemed necessary to encourage the commercial exploitation of the computer program.

If the program were assigned, the Government would, of course, reserve the right to use the program free of charge whenever it wanted. These are the "march-in" rights that were referred to.

The Copyright Office supports the principle of S. 1581. We also support the bill as drafted. It is a limited response to a specific problem. Federal employees will be more highly motivated to create valuable software if they know they will benefit financially by doing so. I am also persuaded that businesses would be more likely to enter into cooperative research and development agreements with Federal laboratories if they know that their investments in technology will be protected.

Under the current law, those programs developed cooperatively with Government employees fall automatically into the public domain, at least that part of the program developed by the Government employee. I see no reason to treat Government computer program developers differently than Government inventors.

Let me make one remark in passing, Mr. Chairman. I would urge that you bring the legislative branch agencies under the umbrella of the bill. They too should be allowed to copyright cooperatively developed software. The Library of Congress, for example, is funding several joint projects with private sector and foreign libraries related to the preservation of books and motion pictures, and it should be able to copyright any computer programs developed by its employees who are working on those projects.

Senator ROCKEFELLER. That is very helpful, Ralph.

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Mr. OMAN. One other point you might want to consider, Mr. Chairman, is an amendment to the bill that would make clear that what we are doing in the Stevenson-Wydler section of the U.S. Code affects the copyright law by making some cross-reference to it in title 17, which is the copyright chapter. I think that would help those people who read and rely on the Copyright Act and let them know that we have made a very significant change in copyright policy, and that cross-reference I think would be useful.

I do not feel strongly about that point, and you understand my bias, but we would like to have the Copyright Act standing separately by itself, if possible, with all important references contained in it.

Historically, the prohibition against copyrighting works of the U.S. Government was enacted to give unlimited public access to important information and to prevent the Government from exercising censorship. The prohibition on copyrighting Government publications came into the copyright law through the printing law.

In 1895, when Congress created the Government Printing Office, it was decided that the Government could sell the printing plates to the private sector after the initial print run. But many people voiced concern that no one should have a copyright in the works that would be reprinted from those plates—not the private printer and not the Government. So, the rule was made that there should not be copyright on Government publications.

That concept was carried over into the 1909 Copyright Act, and remained in the law until the general revision in 1976. It was then decided that there would be a general prohibition of copyright on works created by Federal employees across the board, not just Government publications. Remember, Mr. Chairman, that Congress wrote that prohibition into the law in 1976, when the Pentagon Papers and Watergate were fresh in people's minds.

People wondered what would have happened if President Nixon had sought copyright protection for the Oval Office tapes. This raises important policy questions in a free society and it is those concerns that Congress was responding to in writing in the absolute prohibition.

Even so, this is not a prohibition against copyrighting works that are merely funded by the Government. The Government funds many works and, as I said, has the power to allow the private contractor to copyright the work if Federal employees are not involved in its development.

Until now, the public interest in encouraging widespread dissemination of Government works has prevented the copyrighting of Government works generally, but I think that a special case can be made for Federal software, specifically those operational aspects of computer programs that Mrs. Morella made reference to.

The time now seems ripe for a change. Computer programs are works of immense economic value, and in today's highly competitive global economy the blanket copyright prohibition for Government works may conflict with U.S. international interests. So, I have concluded, Mr. Chairman, that Federal agencies, including legislative branch agencies, should be allowed to claim copyright in cooperatively developed computer programs.

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S. 1581, if enacted, will stimulate creativity in the public sector and in the private sector and encourage the commercial exploitation and dissemination of these valuable works to the public at large. And that prospect makes more sense than having them gather dust in some Government archive.

Thank you very much, Mr. Chairman. I would be pleased to answer any questions.

[The prepared statement of Mr. Oman follows:]

PREPARED STATEMENT OF RALPH OMAN

Mr. Chairman and members of the Committee, I am Ralph Oman, Register of Copyrights. I thank you and the members of the Committee staff for giving me the opportunity to appear today in this congressional hearing on copyright of federally developed software and ways to transfer this government resource to the private sector. S. 1581[1] (introduced by Senator Rockefeller) the "Technology Transfer Improvements Act of 1991," would amend title 15 to permit federal agencies to secure copyright in software prepared by its employees under cooperative research and development agreements, notwithstanding the prohibition, In section 105 of the Copyright Act, against copyright in works created by United States employees.

Today I will discuss S. 1581 against the backdrop of section 105, which currently prohibits copyright protection for works of the U.S. government. I will also discuss earlier proposals to change the law, including the conclusions of the Government Accounting Office, published March 1990.[2]

1. S. 1581

The Stevenson-Nydler Technology Innovation Act of 1980, 15 U.S.C. § 3710 et seq., currently permits the federal government to enter Into cooperative research and development agreements with a variety of parties, including private corporations, and to own and license patents. The Rockefeller bill, S. 1581, would amend several sections of the StevensonWydler Act to grant similar rights to copyright computer software. Specifically, executive agencies could secure copyright on behalf of the United States, as author or proprietor, in computer software prepared by federal employees within the scope of their employment under a cooperative research and development agreement. Agencies would also be able to license or assign software copyrights, retaining a "nonexclusive, nontransferable, irrevocable, paid-up license to reproduce, adapt, translate, distribute and publicly perform or display the computer software throughout the world by or on behalf of the Government and such other rights as the Federal agency deems approprlate." § 2(a).

S. 1581 defines the term "computer software" to mean "computer program," as that term is defined in title 17,[3] but additionally includes "associated documentation, supporting materials, or user instructions." § 2(b).

Finally, the bill would amend the Stevenson-Wydler Act to permit the payment of royalties to authors of computer programs who are federal employees consistent with the existing scheme for paying patent royalties to federal inventors. § 3.

Significantly, the Rockefeller bill does not directly amend title 17. Title 15 is amended instead, and the bill creates an exemption to section 105 of the Copyright Act,[4] and effectively alters the work-for-hire provision in section 201(b)[5] to permit

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[1] The companion bill to S. 1581 is H.R. 191, introduced by Representative Morella. Hearings on H.R. 191 were held before the House Subcommittee on Technology and Competitiveness, July 18, 1991.

[2] "Copyright Law Constraints on the Transfer of Certain Federal Comouter Software With Commercial Applications" (GAO/T-RCED-90-44, March 7, 1990) ["1990 G.A.O. Report"].

[3] A "computer program" is a "set of statements or Instructions to be used directly or indirectly in a computer to bring about a certain result." 17 U.S.C. § 101 (1976) (definition of computer program).

[4] Section 105 specifically prohibits copyright protection for U.S. Government works: "Copyright protection under this title is not available for any work of the United States Government, but the United States Government is not precluded from receiving and holding copyrights transferred to it by assignment, bequest, or otherwise." 17 U.S.C. § 105 (1976).

[5] Section 201(b) does not mention government works, but it is the Copyright Office's view that reading sections 105 and 201(b) together, the federal government cannot claim copyright as the employer-author of a work-made-for-hire.

Section 201(b) provides that: In the case of a work made for hire, the employer or other person for whom the work was prepared Is considered the author for purposes of this title, and, unless

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the federal government to be considered an author of a program created within the scope of federal employment. Additionally, the definition of computer software In S. 1581 Is broader than the term "computer program" in section 101 of the Copyright Act. This may be insignificant, though, since documentation, supporting materials or user instructions are usually published with the computer program and copyrighted as literary works. Finally, the bill grants to the federal agency involved In the cooperative research and development agreement the choice of securing a copyright, or retaining a license that grants all of the exclusive rights of copyright ownership in section 106[6] of the Copyright Act plus "such other rights as the Federal agency deems appropriate." §2(a). Although this language is rather broad, we assume there Is no Intention to accord the government rights beyond the scope of copyright.

2. Prior Legislative Proposals

Past proposals to change the law affecting government ownership of computer software produced by federal employees took many forms. The "National Defense Authorization Act for Fiscal Years 1990 and 1991," S. 1352, introduced last Congress, closely tracked the rights S. 1581 confers and would have granted to the government a "nonexclusive, nontransferable, Irrevocable, paid-up license," as well as bestowing the right to "create derivative works for or on behalf of the United States throughout the world [from] such technical data or software."[7] By the time the defense appropriations bill was signed into law, however, the provisions relating to copyright were deleted.[8]

In the 100th Congress, S. 1480, the "Department of Energy National Laboratory Cooperative Research Initiatives Act," sought to create property rights for government laboratories, without clarifying the relationship of the proposed legislation to the Copyright Act's prohibition against federal government copyright.[9] It was the Copyright Office's opinion that, based on the legislative history of section 105, works produced for the federal government by an Independent contractor or under a federal grant would be eligible for copyright protection. However, without amendment, section 105 would bar protection of copyrightable subject matter produced by laboratory employees in the course of their government employment.

The G.A.O report suggested amending the Federal Technology Transfer Act[10] to allow federal agencies to copyright and exclusively license federal computer software under a cooperative research and development agreement with a private business enterprise. Such an amendment would allow the software to be copyrighted only if the private party were willing to further develop and commercialize the software.[11] The G.A.O. also suggested amending a section of the Federal Technology Transfer Act to establish a royalty sharing system similar to that now In effect for federal Inventors.[12] The amended law would entitle employees developing commercially valuable software and mask works to royalty income.[13] These recommendations formed the basis for the Rockefeller bill.[14]

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the parties have expressly agreed otherwise In a written instrument signed by them, owns all of the rights comprised in the copyright. 17 U.S.C. §201(b).

[6] The owner of copyright in a work has the exclusive right to do or authorize reproduction, the preparation of derivative works, the public distribution of a work, and the public performance or display of a work. 17 U.S.C. §106(1)-(5).

[7] S. 1352, 101st Cong., 1st Sess. 535-536 (1989).

[8] See Pub. L. No. 101-189, §§3131-3133, 103 Stat. 1674, 5187-5192 (1989).

[9] See S. 1480, 100th Cong., 1st Sess. (1987).

[10] 15 U.S.C. §3710 (1988).

[11] 1990 G.A.O. Report, supra, note 2.

[12] See 15 U.S.C. §3710(c).

[13] "Legislative Changes for Federal Copyright Authority Proposed By Federal Aaencies' Intellectual Property Counsels" (GAO, undated).

[14] G.A.O. made four other suggestions:

1. Amend title 17 to revise the definition of computer software, for purposes of the Federal Acquisition Regulation (FAR).

2. Amend sections 105 and 903 of title 17 in conformity with the Patent Act, 35 U.S.C. §§207-209, to give federal agencies authority to issue exclusive, partially exclusive or nonexclusive licenses to use works, and to protect various other agency rights—such as the right to terminate a license and the right to require periodic usage reports. The government's right to derivative works developed by a licensee would be subject to agencies' implementing regulations and/or negotiation of a licensing agreement.

3. Address the relationship of these suggested changes to the Freedom of Information Act.

4. Consider whether to accord the same rights to government creators in title 17 as are granted to government inventors in title 35.

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3. Copyright Office Views

The Copyright Office supports the principle of S. 1581. It is a limited response to a specific problem. Federal employees will be more highly motivated to create valuable software if they know they will benefit financially by doing so. Likewise, it seems reasonable that businesses could be stimulated to enter into cooperative research and development agreements with federal labs if they know that their investments in technology will be protected. There is no reason to treat government authors of computer programs any differently than government inventors.

On the other hand, the legislative history of the 1976 Copyright Act shows that the issue of copyright protection for government-created works was specifically considered, and that there were valid concerns on both sides of the issue about protecting such works in general. There is a strong policy favoring public dissemination of information. And there is always concern that agencies might misuse copyright to restrict access to federal software, or give favored access to certain groups. The G.A.O. also noted concern that copyrighting federal computer software might distract researchers from the laboratory's basic mission or interfere with informal exchanges among federal and university scientists.[15] On balance, however, the Copyright Office concludes that extending to federal software authors the analogous rights already given to federal inventors should stimulate research and development of software.

The bill will encourage maximum participation of small businesses In federally funded research and development efforts relating to computer software, as well as promote collaboration regarding software between commercial concerns and nonprofit organizations.

It does notappear that the Stevenson-Nydler Act applies to the Library of Congress, which is neither an executive department nor an executive agency.[16] Accordingly, we would suggest that the legislative history or text of S. 1581 be clarified to indicate that legislative agencies, like the Library, may also secure copyright In computer software developed through cooperative research and development agreements.

4. The Historical Background of Copyright in Government Works

Statutes before 1895 were silent on the copyrlghtability of government works. However, for public policy reasons, several court decisions established that laws, judicial decisions, governmental proceedings and similar official documents should be freely available and could not be copyrighted, although accompanying commentary, annotations, and headnotes were protectible. Several cases sustained a State government's copyright in additions of this sort prepared by its employees. Thus, although governmental edicts and rulings were not copyrlghtable, there was nothing preventing at least State governmental bodies from securing copyright In other kinds of material.

Availability of copyright protection for governmental works was changed by the Printing Law of 1895, and later solidified by the Copyright Act of 1909. The 1895 Law, which centralized printing for the U.S. Government in the Government Printing Office, contained a provision permitting that office to sell duplicate plates from which Government publications were printed. This was intended to facilitate the private reproduction of government publications. To forestall copyright claims in private reproductions, It was provided that no publication reprinted from such plates and no other government publication could be copyrighted. The legislative history of the prohibition In the Printing Law Indicates that it was aimed at precluding copyright claims by private persons In their reprints of government publications. It was apparently assumed that the government itself would have no occasion to secure copyright in Its publications. ffost government publications at that time consisted of official documents. The Copyright Act of 1909 incorporated the same provision.

Section 8 of the 1909 Act provided that "no copyright shall subslst in any publication of the United States Government, or any reprint, in whole or in part, thereof. * * *" 17 USC § 8 (1909). The ban against copyright in government publications did not, however, extend to the publications of State and local governments. The legislative history of the 1909 Act indicates that the Issue was discussed, but proposals for a ban were dropped primarily because most States did not have their own facilities for printing, and private publishers insisted upon copyright protection.

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[15] 1990 G.A.O. Report, supra, note 2.

[16] See Exec. Order No. 12591, 52 Fed. Reg. 13,414 (1987), as amended, Exec. Order No. 12618, 52 Fed. Reg. 48,661 (1987).

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5. The 1976 Revision

Section 105 of the 1976 Copyright Act prohibits copyright in works of the United States government.[17] This prohibition applies to "any work of the United States Government,"[18] which is defined in section 101 as "a work prepared by an officer or employee of the United States Government as part of that person's official duties."[19] The government cannot gain copyright in works created by its employees by being considered the author of a work made for hire.[20] It can, however, acquire copyright by assignment, bequest, or other transfer of rights.[21]

The scope of the prohibition against copyright protection for government works aroused controversy during the revision of the 1909 Act. The Register's 1961 Report recommended that copyright In government works be permitted In exceptional cases, and this proposal was carried over Into the 1963 draft and the 1964 revision bill.

In the 1961 Report, the Register recommended that "[a] central Government agency should be empowered to authorize exceptions to the general prohibition In special cases, and to authorize the exclusive licensing or transfer of Government-owned copyrights."[22]

The Register's recommendation sparked interest and debate in the panel discussions and subsequent revision bills. Several agencies stated that there were circumstances where it would be highly desirable to permit copyright in works produced by their employees. Examples Included: 1) Where the agency had special reasons to have a work published, 2) Where a work was the joint product of the agency and a private organization desiring copyright; 3) Where a work was produced by the agency under a grant from a private organization desiring copyright; 4) Where an agency sought to operate a self-supporting program for the publication of its research reports; and 5) Where the agency had reason to believe that reproduction of a publication must be controlled to prevent distortion In a dangerous manner. Numbers 4 and 5 were rejected during the panel discussions on copyright revision, but the validity of numbers 1-3 was acknowledged.[23]

Building upon the discussions of possible exceptions to the general ban on government copyright protection, section 4(c) of the 1964 Revision Bill contained the following provision:

> (c) In other exceptional cases, copyright may be secured in a published work of the United States Government where, because of the special nature of the work or the circumstances of its preparation, It is determined that copyright protection would result in more effective dissemination of the work or for other reasons would be in the public interest. The head of the Government agency for which the work was prepared shall make the determination In each case in accordance with regulations established by an administrative officer designated by the President, and shall publish a statement of the basis for Its determination In each case in the manner specified by such regulations. H.R. 4347, 89th Cong., 1st Sess. (1964).

Because of the added layer of bureaucracy for determining exceptions, this provision encountered resistance; however, the basic premise was accepted, that situations existed justifying copyright in government works.[24]

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[17] Section 105 states:

Copyright protection under this title is not available for any work of the United States Government, but the United States Government is not precluded from receiving and holding copyrights transferred to It by assignment, bequest, or otherwise. 17 U.S.C. § 105.

[18] An exception is provided by the Standard Reference Data Act, Pub. L. 90-396, 82 Stat. 339 (1968). A provision of this act amended title 15 of the United States Code by authorizing the Secretary of Commerce to secure copyright on behalf of the United States as author or proprietor of standard reference data. 15 U.S.C. § 290(e). In addition, works created by employees of the United States Postal Service, namely, postage stamp designs, may be copyrighted. See H.R. Rep. No. 94-1476, 94th Cong., 2d Sess. 59-60 (1976) ["House Report"].

[19] House Report at 58.

[20] See note 5, supra.

[21] 17 U.S.C. § 105. See *Schnapper* v. *Foley*, 667 F.2d 102 (D.C. Cir. 1981), cert. denied, 455 U.S. 948 (1982). (Government can obtain assignment of works produced under commission or grant from independent contractors who are not employees of government).

[22] "Report of the Register of Copyrights on the General Revision of the U.S. Copyright Law," 87th Cong., 1st Sess. 133 (House Comm. Print, 1961).

[23] See "Discussion and Comments on Report of the Register of Copyrights on the General Revision of the U.S. Copyright Law," 88th Cong., 1st Sess. 197-206 (Comm. Print 1963); "Preliminary Draft for Revised U.S. Copyright Law and Discussion and Comments on the Draft," 89-105 (1964); "Further Discussions and Comments on Preliminary Draft for Revised U.S. Copyright Law," 88th Cong., 2d Sess. 263-268 (Comm. Print 1964).

[24] See, "1964 Revision Bill With Discussions and Comments," 89th Cong., 1st Sess. 43-56 (Comm. Print 1965).

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The 1965 Revision Bill eliminated the exception language for Government works. In his 1965 Report, the Register stated:

> In the light of the arguments for and against allowing copyright in Government works under exceptional circumstances, we undertook a further exploration of the actual need for exceptions and of the possibility of establishing effective administrative safeguards to ensure that the exceptions would not be abused. Our conclusions, based on the Information we received, were that there are undoubtedly a few isolated cases in which copyright in a Government work would do no harm and might actually benefit the public, but that these cases are quite rare. On the other hand, to set up administrative machinery effective enough to prevent the granting of copyright to Government works in cases where it is not warranted would require extremely elaborate procedures and detailed safeguards. The few cases where copyright would be justified do not, we believe, warrant the establishment of these complex procedures, and we have therefore dropped the provision allowing exceptions from the bill.[25]

Thus, after extensive public debate, the Register's proposals were dropped in the 1965 bill and thereafter.[26] The proposals had been supported by some government agencies and a few book publishers, primarily on the ground that some government works would be given broader and more effective dissemination through commercial channels, and that the public interest would therefore be served by allowing copyright to be claimed in them. The recommendation was strenuously opposed by newspaper and periodical publishers, among others, on the ground that a provision allowing exceptions would be unnecessary and open to abuse.[27]

In 1975, the National Aeronautics and Space Administration (NASA) proposed an amendment which would have allowed copyright to be secured in a government produced work where, because of the nature of the work or the circumstances of Its preparation, it was determined that copyright protection would result In more effective dissemination of the work, or, for other reasons, would be in the public Interest. Under this proposal the head of the agency for which the work was prepared would determine on a case-by-case basis whether a work should receive protection, and would publish a statement explaining each decision. Congress did not adopt this suggestion.

The broad language of the 1976 Act's legislative history, allowing copyright in works created by federal contractors, all but subsumes the general rule prohibiting government copyright. The House Report states:

> A more difficult and far reaching problem is whether the definition (of a Government work) should be broadened to prohibit copyright in works prepared under U.S. Government contract or grant. As the bill is written, the Government agency concerned could determine in each case whether to allow an independent contractor or grantee to secure copyright in works prepared in whole or in part with the use of Government funds. * * *
>
> The bill deliberately avoids making any sort of outright, unqualified prohibition against copyright in works prepared under Government contract or grant. There may well be cases where it would be in the public interest to deny copyright in the writings generated by Government research contracts and the like; it can be assumed that, where a Government agency commissions a work for its own use merely as an alternative to having one of its employees prepare the work, the right to secure a private copyright would be withheld. However, there are almost certainly many other cases where the denial of copyright protection would be unfair or would hamper the production and publication of important works. Where, under the particular circumstances, Congress or the agency involved finds that the need to have a work freely available outweighs the need of the private author to secure copyright, the problem can be dealt with by specific legislation, agency regulations, or contractual restrictions.[28]

Section 105 was enacted to give the public unlimited access to important information, and to prevent the government from exercising censorship. There is a general policy goal of maximizing public access to information essential to an informed populace.

Another basis for restricting copyright in works created by government employees is the so-called "double subsidy" argument: the public pays for the creation of the

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[25] "Supplementary Report of the Register of Copyrights on the General Revision of the U.S. Copyright Law," 89th Cong., 1st Sess. 10 (Comm. Print 1965).

[26] "Second Supplementary Report of the Register of Copyrights on the General Revision of the U.S. Copyright Law: 1975 Revision Bill," (draft) 94th Cong., 1st Sess. 11 (1975).

[27] "Supplementary Report of the Register of Copyrights on the General Revision of the U.S. Copyright Law," 89th Cong., 1st Sess. 10 (1965).

[28] House Report at 59.

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work once through taxes, and should not have to pay a second time through copyright royalties.[29]

In any intellectual property transaction between the United States government and a private contracting party, the government's need for access to and use of copyrighted works, particularly computer programs and data, is balanced against the rights of commercial producers of the material. In the area of defense procurement, for example, the government's needs are especially urgent, often requiring ownership and control over classified or top secret software and data. As a matter of contract law, the government may demand that a contractor preparing a work transfer certain rights to the government as a condition of doing business.[30] Whether an assignment-back of rights is valid has not been definitely settled under the existing copyright law, however.

6. Case Law

The most significant recent case interpreting section 105 of the 1976 Act is *Schnapper* v. *Foley*, 667 F.2d 102 (D.C. Cir. 1981), which involved an action for declaratory relief brought to invalidate the copyright in a series of films about the United States Supreme Court. The films were to be produced by a private independent contractor with the Administrative Office of the United States Courts, with the copyright initially owned by the private party. The contract provided, however, for a later copyright transfer to the U.S. government.

The contractor argued that the 1976 Act (as well as the 1909 Act) did not permit registration of works commissioned by the government or the subsequent assignment of such works to the government.

The District of Columbia Circuit disagreed on the issue of contractor created works, stating: "[i]t is readily observable, therefore, that the language of the new Copyright Act does not prohibit copyright protection for federally commissioned works."[31]

The court also rejected the contractor's argument that the commissioning of the work and later assignment back to the government were intended to bypass section 105:

> Without laying down a broad rule, we are reluctant to cabin the discretion of government agencies to arrange ownership and publication rights with private contractors absent some reasonable showing of a congressional desire to do so. The legislative history noted above indicates a desire to vest the government with some flexibility in making these arrangements. The Mouse Report provides no strong indicia of congressional intent that would lead this court to void the alleged assignment provision. * * * Section 105, therefore, is not necessarily subverted by assigning to the Government the copyright in a commissioned work that is neither produced by current or former employees nor related to the official duties of any Government employee, as here. Had the Government employees been detailed as consultants or employees of [the independent contractor], we might more readily find the purported assignment to be a "subterfuge," but without any such allegation we simply lack the statutory warrant to void the assignment.[32]

Professor Nimmer subsequently criticized the *Schnapper* decision based on the very fact that the contract involved in the case contained an assignment clause to the government. He reasoned that this was evidence that the parties were attempting to subvert section 105.[33] It is entirely possible that another court addressing the assignment issue would not follow *Schnapper*.

Conclusion

The issue of copyright protection for federally produced works is not new. It was considered during the 1976 act revision process and is before us again today. Until now, the primacy of widespread dissemination of government works has prevented the federal government from copyrighting computer software. However, the time seems ripe for a change. There is a viable argument that these works, in addition to being commercially valuable, are essential to national security and defense interests, distinguishing them from more traditional endeavors such as books and paintings.

S. 1581 is an acceptable balancing of the respective needs of the federal government and private sector. However, because the bill affects two key provisions of the

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[29] Id.
[30] See *Schnapper* v. *Foley*, 667 F.2d 102 (D.C. Cir. 1981), cert. denied, 455 U.S. 948 (1982).
[31] 667 F.2d at 108.
[32] Id. at 109.
[33] 1 Nimmer, "Nimmer on Copyright," § 5.06[B][3] n. 23.1.

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Copyright Act—sections 105 and 201(b)—we have a slight preference for amending the copyright law to avoid conflicting interpretations with technology transfer law.

Historically, the government copyright prohibition was based on democratic notions of open government. But in the case of software, copyright covers works of immense economic value, and in today's highly competitive global economy this policy may be in conflict with U.S. international interests.

The Copyright Office supports the principle of the bill. We would request, however, that the definition of government agencies include legislative branch agencies in order to protect any cooperatively developed software. I recommend an amendment of S. 1581 to make clear that the phrase "Federal agency" includes legislative branch agencies for these purposes.

I commend this Committee for its diligence in studying the scope of protection for federally produced works. The Copyright Office will provide whatever assistance is requested in furtherance of this effort.

Senator ROCKEFELLER. Thank you very much, Ralph. Senator Pressler, with your permission, I am going to break my rule here and ask just one question because word has it that one or two members of the second panel may not be in favor of this bill. So, I want them to have to respond to the question I am going to ask you, Ralph, because your words carry great importance here because of your position.

In your prepared statement you say, "historically the Government copyright prohibition was based upon democratic notions of open Government. But in the case of software, copyright covers work of immense economic value, and in today's highly competitive global economy this policy may be in conflict with U.S. international interests."

Then you go on to say 1581 is an acceptable balancing of the respective needs of the Federal Government and private sector. Can you just explain to us why you say it is a responsible balancing?

Mr. OMAN. Your bill is very carefully drafted. It is drafted to solve a specific problem. It does not implicate Government information policy in the broader sense, and I recognize and sympathize with the concerns that will be voiced in the next panel. But I think you have drafted the bill in such a way as to avoid implicating those important public policy matters.

I do not think that it extends beyond the narrow scope that is necessary. It does not get to the data that would be contained on a computer program, only to the operational aspects of that computer program. And I think you have solved the problem very neatly.

Senator ROCKEFELLER. So, data bases are being excluded. What argument could be effectively made against this bill, given that it is responsibly balanced?

Mr. OMAN. The concern, of course, is that this is the foot in the door, that this is the first step onto the slippery slope, that once you let down the absolute prohibition against copyrighting Government works the Government is going to, not right away, but perhaps 2 or 3 years down the road, want copyright protection for other works of economic value, and in that way raise important issues in regard to access to Government information generally.

I do not think this is the first step in that direction. I think this is a very limited response to a limited problem, and I do not see it as a danger.

Senator ROCKEFELLER. This is not a trilateral commission conspiracy?

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Mr. OMAN. Not that I have been able to determine, no, sir.

Senator ROCKEFELLER. Senator Pressler.

Senator PRESSLER. Let me follow this up. The fundamental question this issue raises is why should a private company receive benefit from software that is researched and developed using taxpayers' money. Would anyone care to comment on that?

Ms. WINCE-SMITH. I would be happy, Senator Pressler, to comment on that. Just as in the case of inventions we award patents in order to commercialize the invention, the same logic applies to a software program that is being used for mission responsibilities—a tremendous amount of work has to be done in debugging it, in packaging it, and in putting it in a form where it can be used for commercial purposes.

That involves millions and millions of dollars of development work. And that is where the incentive and the risk issue comes into play. If you do not have any exclusivity to that type of investment, there is a very strong detriment for deciding to go in and do that work. And that is what we are hearing from U.S. companies, and we have that on the record.

There are many, many cases where, as I have said, we have made the overtures and they are not coming forward. These are not programs that are sitting on the shelf waiting for someone to come out and commercialize them in that sense.

Senator ROCKEFELLER. I am really glad that you have all spoken as you have. I really appreciate your being here. We will follow up with more questions.

Our second panel consists of Mr. David Ostfeld, who is chairman of the Intellectual Property Committee, Institute of Electrical and Electronics Engineers; Mr. Steven Metalitz, who is vice president and general vounsel of the Information Industry Association, and he is accompanied by Jerry Berman, who is director of Information Technology Project, the American Civil Liberties Union.

There is a vote. The world has collapsed. There is a vote on right now. What I would like to do, frankly, is to ask each of you, since Senator Pressler cannot stay and I cannot stay, each of you to try to literally boil your statements down to 2 or 3 minutes. In about 8 minutes, Senator Pressler and I are going to gun out of here at high speed, and we want you to be heard. So, please help me with that. Mr. Ostfeld. David.

STATEMENT OF DAVID M. OSTFELD, CHAIRMAN, INTELLECTUAL PROPERTY COMMITTEE, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS-USA

Mr. OSTFELD. My name is Dave Ostfeld, and I want to thank you for having me here today. As you said, I will resist the temptation of cutting off the only person who is going to speak against the bill today, because it is not going to be me. I will try to be as brief as I can.

Obviously, I represent a lot of engineers, almost a million U.S. engineers in these fields—electronics, computers, et cetera—from the IEEE and the AAES.

Senator ROCKEFELLER. David, you are going to have to be 2.5 minutes, 2.5 minutes, 2.5 minutes. I really mean it. It is awful. It is cruel. It is rude. I apologize, but it is what has to happen.

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Mr. OSTFELD. OK. Besides, it is my birthday, but I do not want to talk about that. [Laughter.]

However, when I was a younger fellow and an engineer and really did things instead of what I do now, which is just raise the entropy of the world without doing anything as a lawyer, I used to put in real-time computer systems. As a matter of fact, I did it in the days we used assembly language, and I felt that perhaps today it might be worthwhile to talk a minute about language, about these words we have been using, and maybe I will take my whole 2.5 minutes doing it, trying to clarify things.

Assembly language is just programming. You tell the computer in little 1's and 0's, you put in its memory what the computer is supposed to do. The computer then uses that with the data it has—we will call that data base because it is always organized and the little software knows how to look at the data bases—and it runs the hardware, or the hardware runs it, however you want to look at it.

Technology is getting greater and greater in this mesh of what is hardware and what is software. A lot of question and concern has been what is this word "copyright software" that is going to be used in this act, which we do endorse. We put in a few little amendments we wanted. But we do endorse it.

Basically the software that we have in there is the genius of people for the most part, although computers now write some, to try to instruct the computer on how best to run the system that is being controlled or monitored or put out. The data bases are just organized data. You start with raw data—we have a lot of it in the Government—and you organize it. Copyrights, all that says is hey, do not copy me if you want to organize your data. That does not mean the data is precluded from anybody.

It means my particular organization of that data, presuming it was covered, which is it not, under the bill, my particular data is covered.

What does that tell me?

Senator ROCKEFELLER. That you have 1 minute.

Mr. OSTFELD. Thank you. The software does in fact have some interaction with that, and what you would have to do is independently produce the software again and produce the data bases again, if you wanted to have somebody else use them.

I do not see this as a major problem in the bill, although it has had a lot of emphasis and we are going to cut off everybody in the world from this public data. We, frankly, do support the bill. We do agree that we have an R&D system going in our national labs that is vital for the U.S. economy. It is vital for our industries that are really under pressure.

We have got to be able to use those better, and obviously we are not using them better, when we do not have protection for the software that is part of the commercialized product.

[The prepared statement of Mr. Ostfeld follows:]

PREPARED STATEMENT OF DAVID M. OSTFELD

I am pleased to testify on behalf of the Institute of Electrical and Electronics Engineers—United States Activities' (IEEE-USA) Intellectual Property Committee and the American Association of Engineering Societies' Engineering Affairs Council (AAES-ENAC). The IEEE is a transnational professional technical society whose

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membership currently includes more than 320,000 electrical, electronics and computer engineers worldwide. The United States Activities unit of IEEE represents 250,000 of these engineers who live and work in the United States. AAES is a federation of 22 professional engineering societies who represent over 600,000 U.S. engineers.

Our U.S. members believe that the "Stevenson-Wydler Technology Innovation Act of 1980" and the "Federal Technology Transfer Act of 1986" have played an important role in stimulating and increasing the quality of technology in the United States. With advancements in technology, the need for intellectual property protection has become increasingly necessary.

However, under present law, government agencies working on research and development in cooperation with private industry are only permitted to file for patents—not copyrights. The "Technology Transfer Improvements Act of 1991" (S. 1581) would allow Federal agencies to secure copyright rights for computer software, prepared in whole or in part by employees of the United States government, while working under a cooperative research and development agreement (CRDA) with the private sector.

Without such protection this software technology may be open to public use. Thus, foreign nations would benefit from this type of U.S. government software technology without providing any monetary payment to the United States taxpayers or to Federal employees in the form of an incentive. The private sector who paid for the development of the software would also be without protection. In an age of increasing pressure to stabilize taxation and reach a balanced Federal budget, industry has been encouraged to assist in funding joint research and development projects with the Federal government. Without protection of computer software, there is less incentive for the private sector to enter into CRDAs, and the societal value of such projects would diminish.

As stated above, our members believe that there is definitely a need for protection of computer software. However, at this time, we only recommend protection for computer software generated within the scope of a CRDA.

Our members do not believe that S. 1581 will block public access to already existing Federally generated computer software since the legislation does not appear to be retroactive. Additionally, it would be difficult to bring preexisting software under the CRDA umbrella because, except for undistributed software, it is highly likely that the public has already obtained copies of such software. To protect preexisting software would be comparatively disadvantageous to newcomers who would have to pay for the software while those who are already in the market would not.

Further, we believe that the public should have access to any Federally generated software—even software that possesses a copyright. However, we believe that a fee should only be charged for commercial distribution of the software and databases so that incentives are provided to Federal employees. Payment should be made by those who gain commercial distribution reward from the software and databases. These payments should be used for reimbursing taxes expended to produce the software and database. Accordingly, the individual should be permitted to use software obtained directly from the U.S. government without charge, while those who commercialize the software would pay for it. Also there should be a threshold minimum payment calculated on an annual basis below which nothing is due to the U.S. government. Therefore, those who distribute this software, at cost and for the public good, may continue to do so without the burden of royalties. These incentives should stimulate and increase the quality of technology in the United States, as the "Stevenson-Wydler Act of 1980" and the "Federal Technology Transfer Act of 1986" have already done.

IEEE-USA, which has over 22,000 Federal employees as members, believes that improvements still need to be made with respect to incentive programs for Federal employees and in the commercialization of Federally generated software. However, we are convinced that the "Technology Transfer Improvements Act of 1991" (S. 1581) is certainly a step in the right direction.

The bill will enhance U.S. competitiveness and provide rewards to both Federal government inventors and authors of computer software—both of which are priorities of IEEE-USA.

In closing, a concern that IEEE-USA has with respect to S. 1581, is that the U.S. government should not be permitted to be hired by industry, solely for the purpose of developing software for private industry. We have also included an amendment to identify the specific authors of the computer software so that they would receive appropriate royalties. We have attached these amendments and others to reflect our position and specific technical clarification.

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We thank you for the opportunity to share our views on copyright protection for computer software and the "Technology Transfer Improvements Act of 1991" (S. 1581). I would be happy to answer any questions that you might have.

AMENDMENTS TO THE "TECHNOLOGY TRANSFER IMPROVEMENTS ACT OF 1991"

(S. 1581)

Line 7—Delete "author or".

Comment: The reason for deleting the words "author or" is to make sure that the actual authors of the computer software may be identified to the extent they are employees of the United States government for appropriate royalty distribution.

Line 10—After "agreement", insert "wherein inventions and copyrightable material is contemplated to be developed".

Comment: This amendment is suggested to avoid any criticism that might be levied that there was a potential that the United States government could be hired by industry solely for the purpose of developing software by private industry. This would obviously be contrary to the general premise of the amendment which would be to further the basic research being done by the United States government in conjunction and cooperation with industry. While IEEE-USA supports the proposition that valuable software generated by U.S. employees should also be protected by copyright registration and licensing, IEEE-USA believes that the "Technology Transfer Improvements Act of 1991," is not the appropriate vehicle for implementation of this concept.

Line 9—After "Government in", insert "contemplation of or in".

Comment: This amendment is suggested because many of the best ideas originate prior to the actual agreement and course of work under a cooperative research and development agreement. In contemplating the project much conceptual work occurs and to preclude the United States government from obtaining copyrights during this period might be contrary to the general thrust of the bill.

Line 18—After "distribute," insert "use."

Comment: This amendment would serve as further clarification, so that the Government would be able to use the software as well.

Line 18—After "distribute" and if "use" is amended, add "lease, loan, rent,".

Comment: If the amendment above in line 10 is not placed into the final bill, then the words "lease, loan, rent," in this suggested amendment should not be included because the U.S. Government should not contract solely to produce software with the private sector nor should it commercialize said software without further safeguards not contemplated by this bill.

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Line 1—After "documentation," insert "physical embodiments,".

Comment: This merely expands the definition of computer software.

Senator ROCKEFELLER. Thank you, David. Steven.

STATEMENT OF STEVEN J. METALITZ, VICE PRESIDENT AND GENERAL COUNSEL, INFORMATION INDUSTRY ASSOCIATION

Mr. METALITZ. Thank you, Mr. Chairman. I am here representing the private sector, the only witness representing the private sector information industry. The Information Industry Association includes more than 600 companies, meeting the information needs of the American public, many of our companies have valuable information products and services that are based upon Government data in the public domain.

Our companies add value to those data bases. They market the resulting products, and they are highly competitive. In fact the U.S. information industry is the strongest and most competitive information industry in the world.

Our purpose in being here is simply to raise some serious concerns about S. 1581. Our main concern is the effect that it will have on section 105 of the Copyright Act and on the strong policy,

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the century-old policy, against Government copyright of its works that is reflected in section 105.

The reason we raise these concerns about this bill is because the future of Government information is not in the paper that is before you or in your briefing book, Mr. Chairman; it is in a compact disk like this. This is one from the Census Bureau. It is a single product that brings together computer software, which under your bill could be copyrighted and to which public access could be denied under the bill, and data, which is also resident on this disk and to which we feel the guarantee of public access is extremely important, not only for the information industry but also for the American public as well, which enjoys unparalleled and unequalled access to information about its Government.

It is a defining difference between our society and less open societies, and we feel that this committee should certainly take the time to examine very carefully what the impact on that principle will be before it rushes to action on this legislation.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Metalitz follows:]

PREPARED STATEMENT OF STEVEN J. METALITZ

The Information Industry Association (IIA) appreciates the opportunity to provide its perspectives on S. 1581, the Technology Transfer Improvements Act of 1991.

IIA is a trade association representing more than 650 leading companies that pursue business opportunities associated with the creation, distribution, and use of information. Our members develop and distribute innovative information products and services in order to meet the information needs of American business, researchers, and the public. Since its founding in 1968, IIA has had two paramount public policy concerns: the need for strong, clear copyright protection to promote the development of these new information products and services; and the right of public access to information developed by the federal government. S. 1581 presents an issue that occupies the intersection between these two major thrusts: the power of the federal government to claim copyright in works of its employees.

IIA has a diverse membership, ranging t'rom small start-up companies to giant multinational corporations. The interests of these companies in the issue before the Committee are equally diverse. Some IIA members develop and market computer software of all kinds. Many other members are database and electronic information providers whose markets are highly dependent on the availability and quality of a wide range of software products. Many IIA members play a key role in disseminating federal government information to broader business and consumer markets. These companies, which create new information products and services by adding value to data obtained from the federal government, depend upon fair and unfettered access to federal government information in order to serve their customers. Finally, many IIA members have extensive commercial dealings with federal agencies, which are an important market for a wide range of private sector information products and services.

Despite the diversity of interests it represents, IIA's perspective on the issue of copyright of federal government software is clear. Unimpeded public access to government information, and strong intellectual property protection for private sector information products and services, are two of the main reasons why the U.S. information industry is the strongest and most competitive in the world. The long-standing prohibition against copyright in federal government works is a cornerstone of both of these key aspects of our information marketplace. The vitality of that marketplace depends in significant part upon the preservation and strengthening of this fundamental feature of U.S. law.

Any legislative proposal to erode the prohibition against federal government copyright should be accorded the most intensive scrvtiuy. If, following that examination, Congress concludes that the proponents of change have met the heavy burden of persuasion properly imposed on them, any authorization of federal government copyright in its works should be narrowly drafted to preserve the crucial benefits of the general prohibition to the greatest extent possible.

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IIA's perspective on this legislation seems to be shared, at least in broad outline, by an unusually diverse group of interested parties. Attached to my testimony is a letter to Chairman Hollings, signed by 19 trade and professional associations, commercial information providers, and public interest and civil liberties groups. Despite their sometimes sharp disagreements on many aspects of information policy, these organizations share a common concern with safeguarding and expanding public access to government information. They are all concerned that enactment of S. 1581 in its current form could have a significant detrimental impact on the public's "right to know," and they all urge Congress "not [to] deviate from decades of settled federal government copyright policy without a thorough examination of the potential impact of the bill upon public access to government information in the current technological environment." While the following testimony is offered only on behalf of IIA, we believe these other companies, associations and organizations have valuable input to offer, and we strongly urge the Committee to provide them with an adequate forum to do so before it takes action on S. 1581.

Before turning to the policy underlying current law, and why we believe Congress should approach any proposed changes with considerable skepticism, let me make it clear that IIA fully supports the goals of proponents of these changes. Facilitating the efficient transfer of technological developments from federal government labs to the private sector for further development and commercialization is an important objective, whose significance can only increase as U.S. companies embark on a future of intensified global competition. The encouragement of cooperative research and development endeavors among federal, state, academic, and industrial researchers is a valuable component of the response to this challenge.

Indeed, the experience of the information industry may be instructive here. Many of our member companies have been highly successful in developing innovative, useful products and services, based upon government data in the public domain. These products deliver real value to American businesses and consumers, and have thrived in a competitive global marketplace. Government claims of copyright in this information would not have facilitated the development of these value-added information products and services. To the contrary, federal government copyright would have stunted the growth of the U.S. information industry, or destroyed it altogether. There may be lessons here with regard to the computer software which is the subject of S. 1581.

Our concern, simply, is that the right means must be employed to advance the technology transfer goals. Our warning is simply that choosing the wrong means could have a serious detrimental, though unintended, effect on fundamental values of intellectual property protection and open government.

I. THE PROHIBITION ON COPYRIGHT IN GOVERNMENT WOKS IS AN ESSENTIAL ELEMENT OF U.S. INFORMATION POLICY

Some advocates of proposals to allow the federal government to assert copyright in computer software developed by its employees portray this change as a logical continuation of the recent evolution of government patent policy, as an incremental step that follows naturally from legislative changes made in technology transfer policies in the 1980's. If there is one message IIA hopes to send with its testimony today, it is that this description is fundamentally mistaken. There is a Rubicon here, and if Congress chooses to cross it, it should do so with full knowledge of the significance of its decision.

The policy at issue is now codified in section 105 of the 1976 Copyright Act, which states that "[c]opyright protection * * * is not available for any work of the United States Government * * *". 17 USC 105. But its lineage goes back at least a century, and indeed it embodies important values upon which our nation was founded. The concept that the unrestricted flow of information is essential for our democratic society inheres in the First Amendment's dictate that government may not infringe on free speech. A democratic government must recognize that public access to government information is a right, not a privilege, and that a citizen who obtains such information is entitled to use and disseminate it free of government restrictions or government exactions of royalties.

These bedrock principles of open government are fundamentally at odds with government claims to copyright in government information. Our society, with its unique devotion to free speech, stands nearly alone in this regard. The laws of most other nations permit national governments to exert copyright or similar controls over some or all works authored by their employees. In those countries, information collected from citizens or compiled at taxpayer expense is made selectively available to a favored few, or sold to the highest bidder. In our society, such information is freely available to any citizen on equal terms. This defining difference between open

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and less open societies is directly implicated by the proposals before the subcommittee today.

As early as 1895, Congress enacted a statute forbidding the federal government to claim copyright in its own works. Since 1909, this prohibition has been codified in the copyright laws. It was reenacted and even strengthened in 1976, when present section 105 was adopted. As the Register of Copyrights told a House subcommittee last year:

> Section 105 was enacted as part of the Copyright Act of 1976 to give the public unlimited access to important information, to prevent the government from exercising censorship, and to preclude the government from using copyright in government works as a shield that would prevent selected groups from acquiring information. * * * The theory is that a strong democratic society is a well informed society, and that allowance of government copyright would only restrict free dissemination of valuable government data. That theory remains as strong and as compelling today as it was last year, last century, and at the time of our nation's founding. Proposals to limit its scope should properly be required to bear a considerable burden of persuasion.

Such proposals are not new.[1] As long ago as 1961, the Register of Copyrights recommended legislation to allow the government to claim copyright in "special cases where the extraordinary circumstances warrant the departure from the general rule" of prohibition. The proposal ignited an extensive debate that culminated in the Register's decision to drop the recommendation because, in his words:

> [while] there are undoubtedly a few isolated cases in which copyright in a Government work would do no harm and might actually benefit the public * * * these cases are quite rare.

Nor is it a novel idea that the law should be changed to permit the government to claim copyright in its works in order to facilitate technology transfer. A legislative proposal along this line was made by NASA as early as 1975. During the 1980's, a decade in which technology transfer legislation was almost continually before the Congress, it was frequently argued that copyright should imitate patent law, in which the government has historically been empowered to exercise exclusive rights over inventions made by its employees within the scope of their employment. Congress was never persuaded to do so.

Indeed, only once in the century since the first statutory ban on government copyright was enacted has Congress limited the scope of the prohibition: in 1968, with enactment of the Standard Reference Data Act, 15 USC sec. 290 et seq.

Thus, in order to enact any proposal to allow the federal government to copyright computer software, Congress would have to be persuaded to cross a clear line which it drew a century ago; which it has redrawn in the same place on at least two subsequent occasions; and which it has repeatedly and recently declined to cross when urged to do so for the very reasons which animate the pending proposals. Clearly, given this history, those proposals should be accorded the most intensive scrutiny before they are accepted. The fact that they appear limited to a particular type of copyrighted work—"computer software"—does nothing to lighten this burden of persuasion, and indeed could well increase it.

II. THE PRINCIPLES UNDERLYING CURRENT GOVERNMENT COPYRIGHT POLICY ARE FULLY APPLICABLE TO COMPUTER SOFTWARE

As the Committee considers proposals to lift the ban on government copyright with respect to certain "computer software," it should first insist on a clear definition of that term. It then must evaluate arguments that "computer software" should be treated differently from all other types of works of authorship, either because of what "computer software" is, or because of what it is not.

Definitional Issues

The term "computer software" does not appear in the Copyright Act, so it must be further defined if government agencies are to know exactly what types of works may now be the subject of federal copyright assertions. The Copyright Act does define the term "computer program," as follows: "a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result." 17 USC 101. However, clearly most advocates of cutting back on section 105 find this definition insufficiently expansive t'or their purposes. S. 1581 builds on the Copyright Act definition but adds "any associated documentation, supporting materials, or user instructions." S. 1581, sec. 2(b). Some agency patent counsel suggested

[1] For an excellent survey of the historical background and current debate, see Klipper, "The Copyrightability of Software Created by Federal Employees", Computer Law Association Bulletin, vol. 5, no. 2 (1991), a copy of which has been furnished to the Committee.

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to GAO that the term also embrace "any other data that would enable a computer program to be recreated, reproduced or recompiled." 1990 GAO Report, App. II, at 48. The working definition GAO ultimately used included "related documentation but not searable data bases." Id., at 10 n.2 (emphasis added). (The obvious implication, discussed below, is that some databases cannot be separated from associated computer programs and therefore should be subject to copyright assertions in "computer software.") Some agency officials evidently thought the effort to separate computer programs from databases would be wasted, and forthrightly advocated dismantling of the section 105 prohibition as to the latter as well as the former. Id., at 35. "Several agency officials" took the argument to its logical conclusion and advocated outright repeal of section 105 for all government works. Id., at 36.

Certainly Congress could, if it chose, exclude a defined category of works of authorship from the reach of section 105. It can make one slice into the ban on federal copyright without giving away the entire salami, as "several agency officials" told the GAO it should do. However, there are inherent difficulties in defining the "computer software" slice, as the preceding definitions may suggest. Perhaps the most critical one is the distinction between a computer program and a computerized database.

In theory, at least, that distinction may be summarized as follows. A computer program, as defined by the Copyright Act, is a "set of statements or instructions" to be implemented by a computer. A database, on the other hand, is the compilation or set of data upon which the computer operates. Some of that data may actually be a part of the computer program itself. Both the computer program and the database may be embodied in a variety of forms, including electronic versions on tape, compact disc, diskette, or some other medium, or hard-wired into the layout of a semiconductor chip. Indeed, both the computer program and the database can be, and commonly are, embodied in the same physical object.

Even this oversimplified summary makes it obvious that it is not always easy to distinguish between a computer program and a database, nor to separate one from the other when an unauthorized reproduction (or other violation of the author's exclusive rights) occurs. To allow the government to assert copyright in computer programs, even with the intent to leave federal government databases in the public domain, raises thorny problems whenever it is difficult to separate the two interlinked works.

That is an increasingly common circumstance, with significant implications for the key principle underlying section 105: public access to government information. Increasingly, government records of all kinds are maintained only in machine-readable formats, consisting of both computer programs and databases. Access to the underlying data is impossible without the ability to use the associated search and retrieval software. Similarly, in expert systems, the knowledge base of data is useless without the ability to manipulate it using the artificial intelligence software with which it is closely linked.

in these and other examples, *the ability to assert copyright over the computer program readily translates to the ability to control access to the underlying data.* Different formulations of the definition of "computer software" may place the government at different points on the slippery slope leading to copyright of federal databases, but even the narrowest definition could have some detrimental impact on public access to government data. This impact, with its profound consequences both for the private sector information industry and for the general public which depends on its products, is the most significant immediate threat IIA perceives in proposals to allow the government to copyright "computer software."

In this respect, the proposal before the Committee typifies a disturbing trend toward increased government control over information. This trend is most pronounced at the state government level, where section 105 does not apply. State and local governments are aggressively asserting copyright over works ranging from computer programs to compilations of state statutes, with disastrous impacts both on the competitive marketplace and on public access to information. Even at the federal level, the policy principles embodied in section 105 are under attack. For example, the House Merchant Marine Committee recently approved legislation directing the Federal Maritime Commission to charge a copyright-like royalty for on-line access to computerized tariff data, not only by information vendors who obtain this data directly from the agency, but also by subsequent parties in the distribution chain. This proposal, which clearly violates the policy underlying section 105, will have the effect of decreasing public access to the data, and will reduce incentives for the development of improved private sector information products based on the data.

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Is "computer software" different?

Whatever their precise definitions of "computer software," most advocates of exempting these works from the ban on government copyright argue that "software is different" from other works. Consequently, it is argued, software may be excluded from the reach of section 105 without undermining the integrity of the century-old policy embodied in the statute. These arguments turn either on what "computer software" assertedly is, or else on what it assertedly is not.

Taking the second category of arguments first, it is sometimes argued that "computer software," particularly that developed under cooperative research and development agreements, is not the kind of material Congress had in mind in 1895 or 1909 when it codified the ban on federal government copyright. In that era, it is said, government works were limited to material that more directly implicates First Amendment values and the capability for self-government, such as the texts of statutes and court decisions. The relatively arcane computer programs involved in this debate are quite different, it is argued, and can safely be withdrawn from the public domain without any adverse impact on open government or similar core values.

There are two responses to this argument. First, as noted above, computer software is a gateway to a wide range of government information, which may be accessible only through a computer program. Allowing the government to claim copyright in software will, either immediately or in the near future, threaten full public access to government databases. These databases do, indeed, differ from the material Congress had in mind in 1895 or 1909, but mainly in that they play a more significant role in more aspects of American business and social life than could have been imagined at the turn of the last century. Indeed, every segment of American society now depends on access to information in government databases to pursue a wide variety of public and private goals. The private sector information industry meets this need by adding value to government economic, statistical, scientific, technical, and other databases, and giving customers convenient and timely access to them in useful media and formats. Preserving that access is central, not peripheral, to the policy underlying section 105.

Second, even with regard to a narrowly-defined category of works centered on computer programs, computer software authored by government employees has potentially great economic signficance. While the commercial potential of this software is often cited in support of proposals to cut back on the scope of section 105, in fact it can be viewed as an argument against withdrawing these works from the public domain. The prospect of significant financial gain from licensing its employee-developed software cannot help but turn the incentive structures of a government agency and its employees away from public purposes and toward whatever activity will produce more revenue. The danger of discriminatory treatment in licensing also grows. The agency may even be tempted to bring its valuable software into the market itself, competing unfairly with private sector firms that do not enjoy taxpayer subsidies. Even if this consequence can be avoided, public access to the work product in question can suffer.

The issue of the government's role in developing computer programs has been in the news lately. Recently, a federal court issued, then vacated, an order denying Ashton-Tate copyright protection in its leading database management software program, dBase, on the grounds that the company failed to disclose that the program is based upon software developed by the federal government. Without getting into the merits of that dispute, it is worth contemplating how different the stakes would be if section 105 did not apply to computer programs and the government had claimed copyright in the purported predecessor to dBase. The issue today is whether part or all of dBase is in the public domain, where software innovators can use it as a platform for further improvements. But if section 105 had not applied, the issue would have been whether mass market database management software would now be controlled by the federal government—whether a government agency would decide who would be granted or denied access to this useful and widely needed technology. While neither outcome may be desirable, IIA would submit that the latter case is far more troubling than the former.

Finally, some arguments that the nature of computer software renders section 105 inapplicable should be disposed of. The suggestion that the functional or utilitarian aspect of some computer software should justify different treatment under section 105 should be rejected, just as Congress and the courts have consistently rejected the idea that the functional value of computer programs make them somehow less worthy of copyright protection than other, more traditional works of authorship.

In a related vein, it has been argued that the availability of patent protection for some software-related inventions renders obsolete the distinction between the inventions of federal employees, in which the government can hold a patent, and their development of computer programs, in which section 105 bars government asser-

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tions of copyright. The subject of the so-called patent-copyright interface in the field of software is a complex one. For now, it suffices to say that patent protection does not pre-empt copyright protection, nor vice versa. Congress has consistently treated patents differently than copyrights for purposes of federal government claims, despite repeated recent suggestions that the distinctions be erased. Under current law, a federal employee whose software innovation is incorporated in software-related invention may gain access to a royalty stream, while one whose computer program does not satisfy standards of patentability may not. Whether in these cases the two employees are, in fact, similarly situated is far from self-evident. Legislation to equalize their status seems premature at best.

III. ALTERNATIVES TO, AND COMMENTS ON, S. 1581

Turning to the specific proposal before the Committee, IIA offers the following comments concerning S. 1581.

As discussed above, a considerable burden of persuasion should be imposed upon any proposal to tamper with the long-standing and highly successful policy embodied in section 105. The goal of facilitating technology transfer is an important one, but the Committee should seriously consider whether it may be advanced as effectively without departing from at least a century of consistent policy. In particular, *the Committee should not approve the legislation without solid evidence of specific technologies that would have been commercialized but for the inability of the federal government to assert copyright in software developed by its employees in the context of a cooperative research and development agreement.*

In IIA's view, the public record before Congress thus far does not add up to a compelling case for tampering with section 105. As we discuss in more detail below, S. 1581 would only apply to part of the spectrum of research and development collaboration between federal and nonfederal researchers. Most of the examples that have been cited in support of the legislation are not even drawn from the relevant part of the spectrum. Most of them concern either the use, or misuse, by private sector firms, of computer programs authored wholly by federal employees, and therefore in the public domain; or else problems arising from government demands for copyright control over programs authored wholly by nonfederal researchers under contract to the federal government. Neither of these situations would be reached by S. 1581, and nothing in the record compellingly shows that either sort of problem would be ameliorated by cutting back on section 105.

To the extent the problem areas identified so far require corrective action, there is no need to amend section 105, and, indeed, perhaps no need for legislation at all. For instance, it has been claimed that some private sector firms have simply "slapped a copyright notice" on federally developed public domain software and aggressively marketed it as their own work. This problem, for which legal remedies already exist, could be ameliorated by creating a registry for the deposit of software created by federal researchers. The deposit would establish precisely the level to which the federal researchers had taken the software in question, and would facilitate later determinations of whether a particular private sector software product was, in fact, simply a substantial copy of the public domain software that had been deposited. The registry could itself serve as a useful tool for transfer of software technology to the private sector, by reducing the uncertainties faced by a party seeking to develop and commercialize software of federal origin.

Similarly, when research and development activities are carried out solely by nonfederal parties undor contract with the federal government, the non-federal researcher is almost invariably the author, and therefore the initial copyright claimant. The controversy in this context is over whether the non-federal party may keep these rights, or must surrender some or all of them to the federal funder of the research. IIA generally supports the consensus that technology transfer in this context is best promoted by rules that leave most of these rights with the non-federal author, and that minimize the government's proprietary claims.

Assuming that the Committee concludes there has been a compelling demonstration of problems which cannot be addressed by alternative means, IIA urges that careful attention be paid to the following issues with regard to S. 1581, or any other proposal to cut back on section 105:

(1) *Definitional provisions.* As discussed above, the works in which copyright may be asserted under S. 1581 extend beyond "computer programs" as defined in the Copyright Act. Absent compelling evidence that transfer of software technology will be completely frustrated unless the federal government asserts copyright control over "associated documentation, supporting materials or user instructions," these elements should be stricken from the definition. Indeed, if possible the definition should be restricted to those specified types of computer programs as to which an

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adequate record of the need for federal copyright assertions has been made. In any case, federal government databases of any kind, whether or not "separable" from computer programs, must be specifically excluded from the definition of works in which the federal government may claim copyright.

(2) *Applicability.* The types of collaborative agreements to which S. 1581 applies should be clarified. GAO's testimony before the House Technology and Competitiveness Subcommittee on May 30 noted that in FY 1989 there were 685 draft and final CRDA's, but over 22,000 "formal arrangements" for collaborative research and development activities between federal laboratories and non-federal partners. It is not clear whether S. 1581 is restricted to software developed in the context of a CRDA only, or whether its reference to "any other equivalent authority" reaches to these so-called "formal 'non-CRDAs'", which are more than thirty times as numerous. Resolving this ambiguity could mean the difference between a narrow exception and a gaping loophole.

Similarly, the bill should not apply, even within a CRDA, where computer software is developed by federal employees without any contribution of authorship from non-federal parties. There is no uncertainty under current law as to the status of such software: it is in the public domain, and should remain there. The bill seems to reach an opposite conclusion, since it authorizes copyright assertion in software authored wholly by federal employees "in the course of work under" a CRDA. Thus, the bill would apparently allow the federal government to give an exclusive license to a CRDA collaborator for software to which that collaborator has contributed no authorship at all. This unjustified result should be prevented.

Even where S. 1581 would clearly apply—where the software is developed through the collaborative efforts of federal employees and non-federal parties—the uncertainties of current law may not be as great as some proponents would suggest. For instance, where the resulting work is not, in Copyright Act terms, a "joint work"—i.e., where the collaborating parties do not intend that their individual contributions "be merged into inseparable or interdependent parts of a unitary whole"—each party is the author of the distinguishable work he has contributed to the collaboration. The work of the federal author is in the public domain; the non-federal author enjoys copyright in his work. This situation may provide a satisfactory basis for further development by the non-federal collaborator.

(3) *Other copyright issues.* The core situation reached by H.R. 191 occurs when federal and non-federal parties collaborate on a "joint work," within the meaning of the Copyright Act. Ordinarily either (or any) of the joint authors of the work may unilaterally license rights in the entire work. S. 1581 would empower the federal government, on behalf of the federal author, to exercise those rights, at least insofar as licensing or assigning the rights to the collaborating non-federal party (while retaining certain rights on the government's behalf). It appears, however, that the government's assertion of copyright is not limited by the legislation to the licensing situation; under the bill, the government "may grant or agree to grant" a license to the non-federal collaborator, but apparently it is not required to do so, and enjoys all the rights of a copyright proprietor in the entire work. In other words, a measure intended to facilitate the exclusive licensing of joint works to the nonfederal coliaborator could be used to empower the federal collaborator to exercise full copyright control, clearly an undesirable result.

For this reason, the Committee should consider whether the problem targeted by this legislation, if sufficiently serious to justify an amendment to the Copyright Act, could be addressed more narrowly than by tampering with section 105 and with the valid policy principles which underlie it. For instance, the subcommittee should explore whether an amendment giving the federal government the power to exclude from the public domain its undivided ownership interest in a joint work, for the sole purpose of transferring that interest to the nonfederal collaborator or other commercializer, would achieve the goal of S. 1581.

Finally, any legislation that would have the effect of excluding material from the public domain should apply only prospectively, to works authored after its enactment. Conferring copyright protection on existing works that have already entered the public domain raises difficult constitutional questions that should be avoided if possible.

IIA appreciates the opportunity to offer its perspectives on the important issues before the Committee this morning. As noted above, we believe that this legislation raises important information policy issues that deserve thorough airing and consideration before the Committee acts. We look forward to assisting Committee members and staff in this effort.

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LETTER FROM JERRY BERMAN, AMERICAN CIVIL LIBERTIES UNION INFORMATION TECHNOLOGY PROJECT, AND STEVEN J. METALITZ, INFORMATION INDUSTRY ASSOCIATION, TO SENATOR HOLLINGS

SEPTEMBER 12, 1991.

The Honorable ERNEST F. HOLLINGS,
U.S. Senate,
Washington, DC 20510

DEAR SENATOR HOLLINGS: The undersigned trade and professional associations, commercial information providers, and public interest and civil liberties organizations, write to express our concerns about the precipitous pace of action by the Commerce Committee on S. 1581, the Technology Transfer Improvements Act of 1991. We believe that this measure raises fundamental questions about preserving public access to government information, and urge that the full committee hearing scheduled for this Friday be postponed to allow adequate time for the Committee to consider the full range of issues posed by this legislation.

For nearly a century, Congress has prohibited the federal government from claiming copyright in the works of its employees. This prohibition, now embodied in section 105 of the Copyright Act, helps ensure unfettered public access to government information, and is a statutory cornerstone in the framework of legal guarantees for a democratic society. S. 1581 proposes to create an exception to section 105, and, for the first tinie, to allow the federal government to assert copyright in computer software authored by government employees.

Enactment of S. 1581 in its current form could have a significant detrimental impact on the public's right to know. Increasingly, computer software is the key to access to government data, which is frequently maintained only in electronic form. Congress should not deviate from decades of settled federal government copyright policy without a thorough examination of the potential impact of the bill upon public access to government information in the current technological environment.

S.1581 was introduced July 29, just prior to the August recess. We learned only last Friday, September 6, that the full Commerce Committee would hold a hearing on S. 1581 seven days later. We do not believe that this schedule allows adequate time for thorough analysis of this precedent-setting bill by organizations concerned about government information and copyright policy. Nor can the Committee develop a full and balanced record on this important legislation if it acts with undue haste. We urge you to work with Senator Rockefeller on a new hearing schedule that will give potential witnesses a reasonable time to study the bill and to decide how best to present their views to the Committee.

Thank you in advance for your favorable consideration of this request.

Jerry Berman, American Civil Liberties Union; Steven J. Metalitz, Information Industry Association; Michael F. Brewer, Dun & Bradstreet Corp.; John F. McIver, Jr., Information Handling Services; Joseph L. Ebersole, Esq., representing Macmillan, Inc.; David Simonson, National Newspaper Association; William Giglio, McGraw-Hill, Inc.; Thomas McLeod, WESTLAW Account Management and Government Relations, West Publishing Co.; Mary Ann Hynes, Commerce Clearing House, Inc.; Allan Adler, Cohn & Marks; Gerald E. Yung, Mead Data Central; Lawrence E. Levinson, Paramount Communications, Inc.; Mitchell Kapor, Electronic Frontier Foundation; Carol A. Risher, Association of American Publishers; Eileen Cooke, American Library Association; Duane E. Webster, Association of Research Libraries; Robert L. Oakley, American Association of Law Libraries; David R. Bender, Special Libraries Association; John Chelen, Unison Institute; and Gary Bass, OMB Watch.

Senator ROCKEFELLER. You are being extremely cooperative and we will follow with some questions about that. I appreciate your helping out because I know you would like to have said more. Jerry Berman.

STATEMENT OF JERRY BERMAN, DIRECTOR, INFORMATION TECHNOLOGY PROJECT, AMERICAN CIVIL LIBERTIES UNION

Mr. BERMAN. Mr. Chairman, thank you for this opportunity.

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I am here as one of the signatories, 20 organizations that signed a letter to you asking that this hearing be postponed so that we would have more time to deal with this legislation.

Senator ROCKEFELLER. You did not make it strong enough.

Mr. BERMAN. Well, we are going to make it strong enough to ask for another hearing because these issues, I think, as you point out, are very important. We are talking about the public's right to know, the underpinnings of which are in the Copyright Act and in the Freedom of Information Act. It is not constitutionally based.

In the electronic age, software is the essential ingredient to understanding the display of public information. That data is meaningless without software, and so the future of the Freedom of Information Act will depend on the Government's ability to control both the cost and dissemination of information. We think that these are important issues. It is not simply technology transfer but but public access to environmental information, information on health, welfare, education, and so forth.

We need to know that this is not going to impose a new burden on the public's right to know. We think it requires much more careful study, and I do not think that the balance has been struck in this legislation. I do not have the evidence of particular examples which need a copyright exemption, but even if these were, this legislation applies to software in general developed under Government CRADA's. It is potentially not narrowly focused.

We just think it is important that we keep the record open, that we enter into discussions. We are not opposed to incentives for technology transfer, but we are opposed to anything which would impair the public's right to know in the electronic age.

[The prepared statement of Mr. Berman follows:]

PREPARED STATEMENT OF JERRY BERMAN

I want to thank you and members of the Commerce Committee for the opportunity to appear before you today to comment on S. 1581, "the Technology Transfer Improvements Act of 1991."

As you know, the American Civil Liberties Union is an organization of over 270,000 members dedicated to protecting and preserving civil and constitutional rights. The Information Technology Project which I direct works to ensure that new information and communications technologies foster democratic and constitutional values. One of those core values is the public's right to know.

Today, the underpinnings for the public's right to know are statutes such as the Freedom of Information Act which sets forth public access rights to public government information and section 105 of the Copyright Act which fosters access to public information by prohibiting the government from copyrighting works produced by the federal government.[1]

Over the last several years, the ACLU,[2] public interest groups such as OMB Watch and the Center for the Study of Responsive Law, press groups such the Reporters Committee for Freedom of the Press, and our leading library associations such as the American Library Association and the Association of Research Librarians have been working on a series of initiatives *to ensure that the public's right to know extends to electronic public information.*[3] For example, Senator Patrick Leahy, Chairman of the Senate Judiciary Subcommittee on Technology and Law will soon introduce FOIA amendments to clarify that the Act includes public information

[1] See Klipper, Michael, The Copyrightability of Software Created by Federal Employees, Computer Law Association Bulletin, Vol 5, No. 2 Page 7.

[2] See Berman, Jerry, "The Right to Know: Public Access to Electronic Public Information," III Software Law Journal, Summer 1989, No. 3 (reprinted by permission from the Markle Foundation)

[3] See Report, "Electronic Public Information and the Public's Right to Know" (Benton Foundation 1998)

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in electronic formats and that software is a "record" for purposes of the FOIA. Recently, Representative Charlie Rose, Chairman of the House Committee on Administration and the Joint Committee on Printing introduced the GPO Wide Information Network Data Online (GPO WINDO) Act, a significant effort to establish on line access to public government information through the Government Printing Office.

Our concern, which I believe is shared by the public interest signatories to the September 18, 1991 letter to Chairman Hollings, is that S. 1581, by creating an exception to the government copyright prohibition for certain government developed software, erodes section 105 and threatens the public right to know in the era of electronic public information.

S. 1581 would permit each Federal agency to "secure copyright on behalf of the United States as author or proprietor" in any computer software prepared in whole or in part by employees of the United States Government in the course of work under a cooperative research and development agreement * * *

The House version, H.R. 191 includes not only a program, as defined under section 181 of title 17, ("a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result"), but "any associated documentation, supporting material, or user instructions."

If software which is used to make government information available or understandable is copyrighted, government can limit access by controlling price and distribution. In effect, S. 1581 would establish a new information exemption under Section B3 of the FOIA. It will also, in our view, adversly impact on the unresolved dispute whether software is a government record under the FOIA.[4] Charging more than marginal cost for software related information, conveying distribution rights to the private sector, or controlling terms of access by virtue of copyright all undermine the purpose of 105 and the FOIA.

Finally, we must point out that our concerns are heightened by a pattern of government initiatives which are eroding public access in the electronic age, including the congressional initiative to charge royalty type user fees for federal maritime electronic tariff information (H.R. 534) and grewing state efforts to produce revenue streams from government data.

Mr. Chairman. We do not oppose efforts to facilitate technology transfers and innovation. However, we must oppose any legislation that may adversely impact on the public's right on its face or which may set a precedent for further erosion of section 105 or FOIA in the future.

Senator ROCKEFELLER. Jerry, what we will do is my office will have more contact with both of you to make sure that we have heard you fully. We have your statement, and we will fully discuss thse issues with you.

Again, I apologize to you. In 7 years, this has never happened to me. Thank heavens most of you come from Washington and you did not come from the west coast or something. But still I appreciate all of you very much.

The hearing is adjourned.

[Whereupon, at 11:03 a.m., the committee adjourned.]

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[4] See, Report, Id. at 7. See *Yeager* v. *DEA*, 678 F.2d 315, 318 (D.C. Cir. 1982) Holding that technical documents necessary to read computer data are more than internal agency material and must be disclosed.

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